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ANNALS

OF

THE ASTRONOMICAL OBSERVATORY OF HARVARD COLLEGE

EDWARD C. PICKERING, Director

Volume LXIV

PHOTOMETRIC RESEARCHES

Made during the Years 1902–1912

◆

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PREFACE.

In several of the volumes of the Annals it has been found convenient to publish separately the memoirs contained in them, rather than to wait until a number are completed, and then combine all as parts of a single investigation. Much time is thus saved, and the form is better adapted to subsequent study of the individual memoirs. Eight papers relating to photometric investigations, generally based upon observations made with the 4-inch Meridian Photometer, are included in the present volume.

EDWARD C. PICKERING,
Director of the Observatory of Harvard College.

CAMBRIDGE, U. S., *October 9, 1912.*

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ANNALS OF HARVARD COLLEGE OBSERVATORY. VOL. LXIV. NO. I.

OBSERVATIONS WITH THE MERIDIAN PHOTOMETER DURING THE YEARS 1902 TO 1906.

IN 1902, on the completion of the observations described in H. A. 46, Part I, the Meridian Photometer was sent to Arequipa for the third time. The observations made with it from 1902 to 1906 are discussed below. This completes, for the present, the large pieces of work planned for this instrument. It will probably now be used mainly to measure the brightness of special objects differentially, by comparison with adjacent known standards, rather than to determine the absolute brightness of large numbers of stars.

The principal reason for sending the Photometer to Peru in 1902 was to complete, to the South Pole, the investigation described in H. A. 46, 56. This consisted in the determination of the precise magnitudes of about four hundred standard stars, each near the centre of a series of regions approximately square, and about 10° on a side, into which the entire sky was divided. Stars of the fifth magnitude and having spectra of the first type were selected, so far as possible, to reduce the errors due to magnitude and color. Each star was to be observed on ten nights, eight settings being made on each night. A large part of the required measures of stars north of declination $-40°$ were made in Cambridge, and are published in H. A. 46, Part I. Various miscellaneous observations were also obtained, among them the comparison stars for Sappho and Iris, contained in the Annals of the Cape Observatory, Vol. 7, pp. 466, 692, for which magnitudes had not already been determined with the Meridian Photometer. The southern standards were observed at Arequipa, and not only the unfinished northern standards but many others were also observed, to determine the difference, if any, in the results of the two series of measures. The greatest care was exercised in making the settings, to see if the errors could thus be reduced, or if they are unavoidable and largely due to variation in the transparency of the air in different portions of the sky. Many other objects, such as comparison stars for southern variables, were also observed.

The method of observation and reduction was substantially the same as that described in H. A. 46, 91, except that, in the later work, two sets of four settings each, instead of one, were made of each star. Each star was compared with σ Octantis, and the two images of σ were compared at the beginning and end of each series of measures. These last comparisons were only indirectly used in reducing the observations, owing to the low altitude of this star and the danger of making the final magnitudes depend largely on that of a single star. The constants of the series, on which the actual magnitudes depend, are derived from observations of several stars, in declination between 0° and −30°, which, therefore, culminate so near the zenith of Arequipa that the correction for atmospheric absorption is insensible. It was intended that five stars, each observed twice, should be used for this purpose, in each series. At first, the number was much larger, but in the later series it was, unfortunately, less. The magnitudes adopted for these stars are those of the Revised Harvard Photometry, and it is on them that the final magnitudes depend. The coefficient of atmospheric absorption, used in correcting the observations of stars culminating south of the zenith, depends on the comparisons of the two images of σ and on observations of several stars at lower culmination. The normal number of these stars was four, each observed twice, so that the number of observations, including those of σ, was about twelve. The number of stars observed north of the zenith was generally small, but four stars in declination between +45° and +65° were usually observed to determine the coefficient of northern absorption.

A summary of the series of observations made during the years 1902 to 1906 is contained in Table I. The Julian Day, omitting the three left-hand figures, 241, is given in the first column. The calendar date is given in the second column, and the sidereal times of beginning and ending, in the third and fourth columns. The number of stars in each class is given in the next six columns. A denotes the stars not employed as standards in determining the constants used in the reduction; S, the standard stars between declinations 0° and −30° on which the constant of the series depends; σ, the observations of σ Octantis; L, the stars observed at lower culmination; N, the stars north of declination +45° used in determining the northern atmospheric absorption. B, indicates the total number of stars observed, and is equal, therefore, to the sum of the preceding five columns. The constant of the series, the coefficient of southern absorption, the coefficient of northern absorption, and the average deviation of these three quantities, are given in the next six columns. The residuals of the measures of σ Octantis, from the assumed mean value, 5.48, are given in the next column, expressed in hundredths of a magnitude. The Age of the Moon is given in the last column.

The observations in 1902, 1903, and 1904, including 26,936 settings, were made by Professor Solon I. Bailey; those in 1905 and 1906, including 11,352 settings, were made by Mr. Royal H. Frost.

TABLE I.

SUMMARY OF SERIES.

J. D.	Date.	Beginning.		Ending.		A	S	σ	L	N	B	Const.	Absorption.		Average Deviation.			Residuals.	Age Moon.
													S.	N.	Const.	S.	N.		
	1902.	*h.*	*m.*	*h.*	*m.*														
5941	July 10	14	20	18	4	38	24	6	6	6	80	6.06	.13	.14	.09	.08	.18	10,11,13,02	6
5945	“ 14	14	26	18	44	80	26	6	8	10	130	6.07	.17	.17	.08	.09	.15	*10*,02,12,*04*	10
5946	“ 15	14	17	18	35	90	20	6	8	10	134	6.24	.22	.24	.08	.06	.09	03,*05*,05,06	11
5961	“ 30	15	27	19	48	102	14	4	6	6	132	5.98	.13	.18	.09	.11	.06	06,*19*,*01*,*08*	26
5963	Aug. 1	16	3	18	25	56	10	4	6	4	80	6.26	.20	.22	.07	.08	.20	11,*03*,*01*,21	28
5970	“ 8	15	52	19	56	84	32	4	8	8	136	6.09	.15	.17	.11	.07	.17	*09*,*07*,07,08	5
5973	“ 11	16	19	19	39	58	22	4	6	4	94	6.08	.15	.16	.07	.06	.08	*01*,*15*,05,01	8
5974	“ 12	16	18	20	30	106	22	4	8	10	150	6.10	.16	.16	.10	.05	.12	00,*01*,*01*,*01*	9
5981	“ 19	16	43	20	57	82	28	4	6	10	130	6.09	.14	.15	.10	.05	.18	05,*01*,*01*,*02*	16
5982	“ 20	16	27	20	32	76	22	4	8	10	120	6.15	.15	.17	.13	.04	.14	02,*02*,*05*,*01*	17
5995	Sept. 2	17	43	21	44	68	18	4	10	10	110	6.09	.18	.19	.08	.11	.09	*12*,*23*,*03*,*09*	1
6006	“ 13	18	12	22	25	60	10	4	8	8	90	6.13	.15	.17	.12	.06	.12	04,*08*,02,*03*	12
6008	“ 15	18	55	22	33	60	16	4	8	10	98	6.04	.14	.17	.14	.07	.19	02,*08*,*11*,*07*	14
6009	“ 16	18	46	22	37	64	12	4	8	8	96	6.05	.13	.18	.08	.10	.12	03,*11*,*12*,*14*	15
6101	“ 17	19	20	22	26	60	14	4	8	4	90	6.14	.19	.25	.14	.15	.11	*04*,*07*,*15*,*21*	16
6015	“ 22	19	50	22	47	62	12	4	10	10	98	6.03	.15	.14	.12	.08	.09	*06*,*11*,10,02	21
6019	“ 26	21	5	23	32	54	10	4	8	8	84	6.09	.15	.19	.07	.06	.09	*15*,11,02,*01*	25
6022	“ 29	20	31	23	22	62	14	4	10	10	100	6.01	.17	.19	.11	.17	.30	01,*08*,*24*,*02*	28
6027	Oct. 4	22	4	0	2	40	10	4	6	8	68	6.07	.13	.17	.07	.08	.10	*05*,*08*,08,*10*	3
6030	“ 7	21	23	23	20	50	8	4	8	6	76	6.08	.15	.18	.06	.10	.17	*01*,*07*,03,*10*	6
6038	“ 15	21	20	0	58	80	18	4	8	6	116	6.10	.14	.19	.09	.08	.04	05,*03*,*02*,*18*	14
6039	“ 16	22	45	1	41	62	4	4	8	8	86	6.31	.20	.23	.13	.09	.09	05,06,03,*05*	15
6068	Nov. 15	23	7	3	14	86	18	4	10	10	128	6.28	.21	.18	.12	.12	.14	01,06,*07*,04	16
6071	“ 18	23	14	3	17	94	22	4	10	8	138	6.17	.21	.15	.09	.13	.07	02,*05*,*09*,*08*	19
6072	“ 19	23	13	3	13	78	16	4	8	10	116	6.28	.25	.21	.09	.20	.10	*19*,*15*,*21*,*10*	20
6079	“ 26	23	47	2	29	60	10	4	8	8	90	6.19	.19	.18	.11	.11	.11	07,*16*,*06*,01	27
	1903.																		
6216	April 11	8	31	12	16	70	10	4	10	10	104	6.28	.18	.16	.12	.15	.13	02,02,02,03	14
6241	May 6	9	45	13	53	84	20	4	10	10	128	6.21	.15	.14	.10	.08	.19	*09*,*09*,13,*10*	10
6242	“ 7	9	48	14	29	108	14	4	10	8	144	6.13	.15	.07	.12	.09	.18	*07*,*09*,02,13	10
6243	“ 8	9	53	14	32	108	18	4	8	10	148	6.09	.13	.10	.08	.10	.12	*12*,*10*,*05*,*01*	12
6244	“ 9	10	5	15	5	112	14	4	8	8	146	6.07	.12	.12	.12	.11	.19	01,*02*,*16*,*07*	12
6246	“ 11	10	18	15	8	98	16	4	10	10	138	6.25	.15	.15	.14	.05	.14	*01*,00,*03*,04	14
6247	“ 12	10	12	15	15	110	18	4	10	10	152	6.22	.14	.20	.14	.12	.18	*11*,*18*,*10*,10	16
6249	“ 14	10	30	15	25	106	22	4	10	10	152	6.23	.16	.15	.10	.12	.18	*10*,*10*,02,05	18
6250	“ 15	10	28	14	34	82	12	4	8	8	114	6.13	.15	.13	.08	.14	.10	*15*,*12*,*01*,*11*	18
6257	“ 22	10	46	15	32	96	14	4	8	10	132	6.27	.18	.19	.23	.13	.21	*09*,*15*,07,21	26
6278	June 12	11	59	16	10	80	26	4	10	8	128	6.22	.16	.19	.11	.10	.18	14,*05*,*15*,*15*	17
6309	July 13	14	13	17	4	48	12	4	6	8	78	6.17	.17	.19	.08	.07	.18	00,*14*,04,*10*	19
6317	“ 21	14	42	18	11	12	8	3	4	4	31	6.16	.19	.22	.05	.24	.14	*11*,*18*,*11*	27
	1904.																		
6578	April 7	8	8	10	44	48	6	4	8	6	72	5.93	.14	.20	.21	.17	.18	06,*17*,*21*,*21*	22
6580	“ 9	8	2	10	26	36	8	4	6	4	58	5.83	.14	.11	.15	.12	.08	*05*,*15*,*08*,*07*	24
6584	“ 13	8	20	10	10	50	4	4	8	8	74	6.01	.17	.21	.23	.20	.15	*28*,*25*,*01*,10	28
6587	“ 16	8	29	10	23	40	6	4	8	6	64	5.91	.16	.18	.12	.13	.09	*16*,*34*,*05*,*12*	1

J. D.	Date.	Beginning.		Ending.		A	S	σ	L	N	B	Const.	Absorption.		Average Deviation.			Residuals.	Age Moon.
													S.	N.	Const.	S.	N.		
	1904.	*h.*	*m.*	*h.*	*m.*														
6589	April 18	8	31	10	27	38	6	4	8	8	64	5.78	.12	.12	.18	.23	.13	*06,10,27,26*	3
6591	" 20	8	40	10	1	30	4	4	6	6	50	5.96	.16	.13	.05	.15	.04	*08*,04,*07,10*	5
6724	Aug. 31	17	39	19	17	26	8	4	4	2	44	5.75	.13	.09	.13	.10	.09	07,*07,21,05*	21
6725	Sept. 1	17	28	18	53	14	12	4	4	4	38	5.94	.19	.16	.10	.10	.11	*02,15,09,14*	22
6731	" 7	0	0	3	54	68	14	4	10	8	104	5.97	.15	.19	.18	.09	.15	15,*06,22,08*	28
6732	" 8	0	6	4	0	138	10	4	6	6	164	6.17	.16	.15	.10	.21	.16	*09,24,16,15*	29
6733	" 9	0	4	4	13	134	12	4	10	10	170	6.19	.15	.12	.06	.15	.17	02,*15,11*,02	0
6734	" 10	23	50	4	2	132	14	4	10	8	168	6.19	.14	.16	.12	.05	.15	*08,05*,00,05	1
6736	" 12	0	22	4	31	84	14	4	10	8	120	6.33	.16	.24	.13	.15	.11	00,*11,15*,07	3
6737	" 13	0	21	3	34	66	14	4	8	6	98	6.34	.16	.29	.07	.12	.14	*04*,18,*11,06*	4
6738	" 14	23	57	4	33	90	18	4	8	2	122	6.30	.14	.31	.12	.09	.08	*05,07,12,07*	5
6766	Oct. 12	3	35	6	20	51	14	4	6	7	82	6.24	.13	.20	.15	.06	.28	*05,12*,05,*12*	4
6767	" 13	3	47	6	23	50	12	4	8	8	82	6.37	.14	.21	.10	.07	.26	03,*02,08*,00	5
6784	" 30	4	4	7	9	60	20	4	6	8	98	6.29	.12	.19	.08	.09	.27	00,04,*12,13*	22
6785	" 31	4	6	7	7	65	14	4	6	7	96	6.35	.16	.25	.10	.03	.17	*01,04,05,01*	23
6797	Nov. 12	4	30	7	28	60	20	4	6	10	100	6.27	.13	.10	.10	.10	.18	*01*,01,*01,08*	5
6798	" 13	4	37	7	14	56	14	4	6	10	90	6.36	.13	.20	.08	.08	.17	05,02,*10,09*	6
6799	" 14	4	29	7	54	66	10	4	6	8	94	6.23	.12	.29	.15	.12	.46	00,*09,13,02*	7
6801	" 16	4	30	8	18	94	14	4	8	10	130	6.26	.14	.14	.06	.11	.17	*08,12,05,11*	9
6802	" 17	5	36	8	28	76	6	4	4	8	98	6.18	.13	.13	.11	.17	.13	*13,05,12,11*	10
6808	" 23	5	44	8	22	61	10	4	6	8	89	6.24	.10	.18	.18	.08	.12	*04*,12,*13,09*	16
	1905.																		
6946	April 10	8	57	13	27	36	4	4	8	6	58	6.30	.21	.23	.15	.14	.07	*12*,11,*07,06*	6
6960	" 24	8	48	12	58	42	8	4	8	8	70	6.22	.15	.28	.16	.12	.16	*05*,00,*03,13*	20
6961	" 25	9	9	13	2	54	8	4	6	8	80	6.14	.14	.19	.07	.15	.13	*09*,13,*01*,09	21
6965	" 29	9	50	12	25	30	4	4	8	6	52	6.25	.16	.18	.07	.14	.14	00,06,15,05	25
6977	May 11	9	55	12	4	43	2	4	6	7	62	6.18	.22	.19	.10	.19	.07	*22,07,01,03*	7
6979	" 13	10	2	12	2	30	2	4	8	8	52	6.16	.14	.18	.06	.14	.25	10,*10*,32,09	9
6981	" 15	10	4	11	41	24	6	4	8	8	50	6.20	.21	.23	.12	.21	.09	*15,15*,21,00	11
7003	June 6	13	5	15	40	38	6	4	8	8	64	6.24	.18	.24	.06	.13	.22	*09*,03,08,*07*	4
7006	" 9	12	24	14	7	26	8	4	6	8	52	6.16	.15	.20	.11	.08	.14	01,12,07,05	7
7017	" 20	13	6	15	21	38	4	4	8	8	62	6.20	.21	.18	.14	.18	.15	03,*23,14*,01	18
7018	" 21	13	46	16	8	46	4	4	8	8	70	6.30	.22	.24	.12	.17	.16	08,*14*,00,*05*	19
7019	" 22	13	47	16	5	36	8	4	8	8	64	6.10	.18	.19	.06	.16	.13	*10,01,06,23*	20
7020	" 23	13	57	16	11	32	8	4	8	8	60	6.11	.17	.20	.14	.11	.11	*18*,05,*08*,14	21
7028	July 1	15	27	18	5	26	8	4	8	8	54	6.12	.16	.19	.09	.16	.13	03,*11*,06,15	29
7030	" 3	15	25	17	28	22	4	4	8	8	46	6.18	.17	.20	.15	.19	.14	02,07,01,*16*	1
7033	" 6	15	27	18	15	32	8	4	8	8	60	6.13	.15	.16	.10	.14	.12	*11*,05,*07,11*	4
7035	" 8	15	46	18	40	36	8	4	8	8	64	6.20	.17	.18	.11	.14	.13	05,05,01,*07*	6
7059	Aug. 1	16	28	19	16	48	6	4	8	6	72	6.23	.19	.26	.02	.11	.20	00,01,*27,06*	1
7076	" 18	17	11	19	50	40	8	4	8	4	64	6.15	.18	.22	.06	.15	.06	15,*03,24,07*	18
7077	" 19	17	21	20	5	30	8	4	8	8	58	6.11	.16	.19	.10	.23	.08	*05,22,17*,00	19
7105	Sept. 16	19	8	21	26	50	6	4	8	8	76	6.03	.12	.13	.09	.12	.22	*13*,00,*10,09*	18
7107	" 18	19	24	21	48	54	8	4	8	8	82	6.06	.16	.10	.15	.18	.13	*04,10*,49,*13*	20
7108	" 19	19	24	21	11	48	6	4	8	8	74	6.04	.14	.13	.08	.12	.13	*03,21,08*,08	20
7110	" 21	20	12	22	48	40	6	4	8	8	66	6.18	.19	.20	.08	.10	.19	*08,15*,10,06	22
7111	" 22	20	14	22	43	42	6	4	8	8	68	6.06	.19	.18	.06	.16	.11	*08,15,27,11*	24
7112	" 23	20	45	23	6	38	8	4	8	6	64	6.17	.20	.25	.12	.14	.08	*09*,04,*01,08*	24
7124	Oct. 5	2	4	5	31	56	4	4	8	8	80	6.28	.20	.19	.08	.15	.07	04,02,19,04	7
7125	" 6	2	18	5	26	56	4	4	8	8	80	6.16	.17	.18	.08	.09	.15	08,*01*,11,00	8

J. D.	Date.	Beginning.		Ending.		A	S	σ	L	N	B	Const.	Absorption.		Average Deviation.			Residuals.	Age. Moon.
													S.	N.	Const.	S.	N.		
	1906.	h.	m.	h.	m.														
7325	April 24	9	12	11	48	20	4	4	4	4	36	6.05	.17	.05	.12	.08	.18	*11,11,11,01*	1
7326	" 25	9	12	12	8	36	2	4	4	4	50	6.18	.21	.15	. .	.10	.16	*03*,06,09,09	2
7387	June 25	13	59	16	25	26	6	4	8	6	50	6.32	.28	.27	.14	.12	.23	*06,09,05,12*	4
7388	" 26	13	28	16	18	36	0	4	4	4	48	6.26	.18	.18	. .	.13	.14	*13*,00,05,*08*	5
7389	" 27	13	47	16	4	36	0	4	8	6	54	6.26	.22	.26	. .	.11	.11	*04*,01,*01,12*	6
7390	" 28	18	33	20	41	22	12	4	8	8	54	6.19	.16	.19	.12	.18	.05	*06,27*,13,*04*	7
7391	" 29	18	34	20	27	22	12	4	8	8	54	6.15	.15	.14	.13	.12	.10	16,16,01,*17*	8
7410	July 18	18	31	20	19	30	4	4	8	8	54	6.08	.15	.16	.02	.09	.11	*01*,15,*05*,06	27
7411	" 19	16	7	18	1	28	6	4	8	6	52	6.21	.20	.18	.16	.10	.17	*18,19*,12,01	28
7413	" 21	16	21	18	42	32	6	4	8	8	58	6.23	.19	.19	.08	.16	.12	16,23,13,*20*	1
7414	" 22	16	22	17	50	30	6	4	8	8	56	6.18	.18	.20	.05	.14	.16	*01*,11,12,07	2
7466	Sept. 12	22	48	2	47	56	2	2	4	4	68	6.19	.15	R	. .	.10	R	03,23,*40,27*	24
7471	" 17	19	9	20	56	14	6	4	8	6	38	6.20	.17	.18	.13	.16	.08	11,06,*08*,09	29
7472	" 18	19	11	20	38	14	6	4	8	6	38	6.14	.17	.15	.10	.13	.16	*09*,09,05,12	1
7473	" 19	19	22	20	45	14	6	4	8	6	38	6.24	.20	.18	.18	.21	.14	26,20,26,32	2
7474	" 20	21	38	1	40	71	6	4	8	5	94	6.30	.25	.23	.11	.26	.24	17,12,26,20	3
7475	" 21	21	48	1	30	70	6	4	8	8	96	6.08	.20	.16	.30	.24	.08	*18*,07,30,09	4
7476	" 22	21	49	1	28	70	6	4	8	8	96	6.20	.22	.21	.10	.19	.08	*02*,30,08,15	5

In the middle of the series taken on J. D. 5941, 5945, and 5946, two additional observations of σ Octantis were made. The residuals were *02*, *05*, *03*, 05, 04, and 06, respectively. On J. D. 7467 it was found that one of the mirrors was partially covered by the cloth used to protect it from the light illuminating the circles. Accordingly, the observations, on J. D. 7466, of H. R. 5339, 5470, 785, 860, and the last two observations of σ were not used in deriving the constants. The first two are retained, however, in the subsequent tables as they do not appear to be especially discordant. The constants for J. D. 7326, 7388, 7389, and 7466 have been assumed.

The measures of stars observed at lower culmination are contained in Table II. These stars are all south of declination −75°, and were used to determine the coefficient of absorption to be applied to stars culminating south of the zenith. The number of the star in the Revised Harvard Photometry, H. A. 50, Table I, is given in the first column. The right ascension for 1900, the declination for 1900, and the magnitude are given in the second, third, and fourth columns, and are taken from the same work. The length of path traversed by the light of the star, in excess of that of a star in the zenith, is given in the fifth column. The unit of path is that of a star in the zenith, and for moderate zenith distances the path is nearly equal to the secant of the zenith distance minus one. The length of path is taken from H. A. 23, Table XVI. The magnitude, derived from the measures contained in this volume, is given in the sixth column. The Julian Day and residuals are given in the next two columns. The residual found by subtracting the magnitude given in the sixth column from that in the fourth is given in the ninth column. A positive value, therefore, indicates that the star is fainter according to H. A. 50 than to the observations discussed here. The stars H. R. 236, 872, 1629, and 6731 culminated so near the southern horizon that they were not used in determining the atmospheric absorption. They have been included, however, in Table II. The star H. R. 5261 is the variable, θ Apodis.

TABLE II.

OBSERVATIONS OF STARS AT LOWER CULMINATION.

H. R.	R. A. 1900.	Dec. 1900.	H. R. Magn.	Path.	Obs. Magn.	Julian Days.	Residuals.	Resid.
	h. m.	° ′						
30	0 5.5	−82 47	5.30	4.8	5.29	6278,6979	02,00,*09*,06	01
47	9.5	−85 33	5.74	3.6	5.74	6244,6278,6960	*15,15,08,12*,14,39	00
98	20.5	−77 49	2.90	9.9	2.82	6242,6960,6961,7006	*04,05*,09,02,*14*,02,08,00	08
236	45.1	−75 28	4.96	15.2	5.31	6243,7006	01,*21*,04,15	*35*
467	1 33.0	−79 0	6.06	8.1	6.08	6241,6246,6247,6249,6946, 7003,7017,7388	06,*13,06,06*,18,08,*01,03,04,32*, 05,*10*,27,34,*20,11*	*02*
512	40.5	−83 29	5.88	4.4	5.91	6250,6257,6946,7018,7019, 7387,7388,7389	03,*05*,20,*06*,28,12,*07,19,02,23*, *06,11*,24,23,*14,15*	*03*
516	41.3	−79 39	6.24	7.3	6.48	7017	*10*,11	*24*
525	43.1	−85 16	5.63	3.7	5.65	7006,7020,7387,7389	05,02,10,*11,09*,20,04,*20*	*02*
550	48.7	−80 41	6.06	6.3	6.06	6242,6243,6278,7003,7006	*04*,02,11,*06*,25,15,*03,15,29*,04	*00*
776	2 33.8	−79 33	5.29	7.4	5.24	5941,5945,5946,6246,6257, 6309,7018,7019,7020	03,*02,14,09*,01,00,00,07,*03*,21, 19,22,*15,17,12,06,06*,18	05
872	51.1	−75 29	4.70	15.2	5.16	5941,5945,6244,6257,6309	*08,28*,29,32,03,*09,17,22*,11,04	*46*
981	3 10.9	−79 22	5.70	7.6	5.64	6247,7017	18,17,03,*37*	06
1025	18.4	−77 46	5.53	10.0	5.56	6249,7017	18,*01,15,04*	*03*
1109	33.6	−78 41	5.64	8.5	5.56	5961,6278,6317,7003,7018, 7019,7028,7030,7033,7035	16,*07*,08,05,*09,13,20,13*,00,12, 31,16,*29,04,13,06*,21,06,*13*,17	08
1154	40.3	−78 39	6.08	8.5	6.39	6278,6317,7003,7018,7019, 7028,7030,7033,7035,7389	*28,15*,09,19,*03,15*,34,07,*18*,22, *03*,05,00,29,*12*,00,06,*14*,00,*28*	*31*
1426	4 24.7	−80 27	5.62	6.5	5.70	5945,5963,5970,5973,5974, 6309,7020,7059,7389,7411, 7413,7414	09,*17,05,05,11,08,07,11,07,14*, *10*,01,*08*,11,07,26,*08*,22,25,*04*, 09,*21*,09,19	*08* *04*
1456	29.8	−81 49	5.79	5.4	5.75	5941,5946,5970,5973,5974, 5982,6309,7020,7059,7411, 7413,7414	17,11,17,06,*02,02,08*,01,06,02, 05,*04*,07,*03,03,12,02*,00,02,*06*, *09*,11,*12,16*	04
1629	58.1	−75 6	5.28	16.7	5.98	5981,5982	*11*,22,*16*,06	*70*
1716	5 10.2	−82 36	5.85	4.9	5.73	5941,5981,7030,7387	07,*06*,04,*05,16*,16,01,*04*	12
1953	35.8	−76 25	5.06	12.7	5.25	6725,7030,7076,7077	*23,23,43,04*,26,*04*,40,30	*19*
1991	41.8	−78 52	6.14	8.2	6.14	5946,7387,7414	09,*12*,10,29,*04,30*	00
2022	45.1	−80 34	5.65	6.4	5.58	5970,5995,7028,7076,7077, 7411,7414	00,*08* 06 *02*,01,00,*04*,00,*14*,16, 18,05,*04,09*	07
2059	49.6	−84 50	6.24	3.8	6.18	5963,6724,7033,7411	10,08,11,07,*22,23*,07,02	06
2125	57.0	−79 23	5.56	7.6	5.54	5945,5946,5963,6006,7028, 7033	10,23,06,06,*17,14*,10,*01,04,18*, *01,06*	02
2559	6 48.4	−80 43	5.64	6.2	5.63	5945,5973,5974,5982,6008, 6009,6725,7035,7059,7105, 7390,7391,7410,7413	00,01,15,03,*03,25*,09,*02,14*,11, 14,16,12,20,*20,14*,15,04,21,14, *16,23*,09,05,*18,05*,06,*34*	01

H. R.	R. A. 1900.		Dec. 1900.		H. R. Magn.	Path.	Obs. Magn.	Julian Days.	Residuals.	Resid.
	h.	m.	°	′						
2689	7	2.9	−79	16	5.51	7.7	5.46	5961,5981,5982,5995,6008,6009,6724,7035,7059,7076,7105,7107,7108,7391,7410,7413,7471,7472,7473	*12*,10,13,10,01,*01*,00,08,09,11,26,20,01,37,03,*19*,*09*,01,*12*,*12*,11,21,*29*,*23*,05,10,*23*,*06*,05,04,03,*21*,08,*03*,*05*,*10*,*19*,*22*	05
2919		31.2	−78	53	5.42	8.2	5.50	5961,5970,5995,6006,6009,6010,7076,7107,7108,7390,7471,7472,7473	10,03,02,*02*,05,*10*,*08*,*06*,*11*,*05*,11,*04*,05,03,*11*,20,*02*,*03*,02,*10*,25,20,19,07,*35*,*14*	*08*
3318	8	21.1	−76	36	4.08	12.3	4.20	5974,6008,6010,7077,7110,7111,7410	00,*10*,*02*,00,24,15,*30*,16,15,*15*,*05*,*04*,*19*,12	*12*
3340		23.6	−77	10	4.26	11.1	4.24	5982,7077,7110,7111,7390,7391,7410	05,11,*20*,*23*,*05*,08,30,25,*13*,*04*,19,*08*,*19*,*04*	02
3393		30.3	−80	35	5.60	6.3	5.75	5981,6015,6022,7112,7390,7391,7471,7472,7473	*12*,*16*,*07*,*11*,17,06,32,08,44,12,*06*,*16*,04,*28*,*17*,03,*17*,01	*15*
3502		44.7	−78	37	5.62	8.6	5.51	5995,6015,6022,7108,7112,7471,7472,7473	33,28,15,19,11,00,*05*,*19*,*12*,*11*,*15*,*21*,*14*,07,*10*,*13*	11
3678	9	11.2	−85	16	5.38	3.7	5.47	5995,6015,6019,7105,7108,	07,08,*01*,*02*,*14*,*04*,01,*21*,20,03,	*09*
3795		27.5	−80	22	5.44	6.5	5.34	6008,6015,6019,7105,7107,	10,11,*10*,*06*,10,05,07,*20*,04,*16*	10
3860		36.8	−80	30	5.24	6.4	5.02	6006,6010,6030,7107,7474,7475,7476	18,12,11,*07*,23,07,30,33,*22*,*27*,*31*,*07*,*09*,*30*	22
3902		46.3	−76	19	5.35	12.9	5.53	6006,6022,6030,7474,7475,7476	02,*13*,21,07,*01*,09,14,*45*,25,15,*10*,*27*	*18*
3983	10	3.4	−81	44	5.62	5.4	5.61	6010,6022	06,00,03,*10*	01
4174		34.3	−78	6	4.10	9.4	4.00	6009,6027,6030,6038	08,*04*,11,02,*07*,*09*,02,01	10
4231		44.4	−79	57	5.48	6.9	5.44	6015,6019,6027,6038,7110,7111,7466	04,*10*,04,*15*,07,*04*,10,15,*09*,01,17,*26*,06,*03*	04
4234		44.8	−80	1	4.62	6.9	4.55	6019,6030,6039,7110,7111,7466	09,20,11,10,*20*,*07*,*09*,*02*,*04*,*01*,*16*,07	07
4312	11	0.0	−84	3	6.26	4.2	6.12	6022,6039,7112	*18*,*10*,11,05,07,05	14
4385		15.6	−79	7	6.29	7.9	6.33	6068,7112	*15*,08,*03* 10	*04*
4507		37.6	−82	32	6.22	4.9	6.36	6027,6068,6072	*03*,06,20,*28*,*02*,09	*14*
4583		54.7	−77	40	5.05	10.1	4.97	6071,6734	*11*,*14*,12,13	08
4595		57.3	−85	4	5.89	3.7	5.98	6071,6733,6734	19,34,*17*,03,*21*,*16*	*09*
4605		59.6	−75	57	5.00	13.8	5.30	6079,6732,6733	*34*,*25*,14,32,06,04	*30*
4674	12	12.5	−78	45	4.38	8.4	4.38	6038,6079,6731,6732	09,17,00,*26*,04,12,*11*,*04*	00
4870		44.4	−84	35	5.38	3.9	5.43	6038,6068,6071,6731,6736,6737,6738	03,00,04,01,01,*07*,*01*,*10*,15,26,*20*,*14*,00,*04*	*05*
5084	13	24.7	−85	17	5.65	3.7	5.59	6039,6071,6072,6731,6736,6737,6738,7474,7475,7476	17,05,02,04,10,*12*,18,21,15,14,*05*,*10*,03,*03*,02,*25*,*10*,*22*,*14*,*03*	06
5188		42.9	−82	11	5.76	5.1	5.98	6039,6072,7474,7475,7476	*02*,*15*,19,12,05,02,*20*,03,*02*,01	*18*
5261		55.6	−76	19	var.	12.9	5.84	6079	17,*16*	var.
5303	14	5.7	−80	32	4.97	6.4	4.84	6079,7124	00,10,*16*,05	13
5336		10.3	−79	39	5.20	7.3	4.89	7124	*09*,09	31
5339		10.9	−83	13	4.14	4.5	4.26	6736,7125,7466	14,06,04,*09*,*14*,01	*12*
5470		35.4	−78	38	3.81	8.6	3.76	6068,6737,6738,7125,7466	*36*,*13*,26,16,10,14,*17*,*10*,00,13	05
5491		39.0	−87	45	6.52	2.9	6.50	6068	01,00	02
5545		47.3	−82	38	5.55	4.9	5.48	6072,6737	*16*,*13*,13,18	07
5557		49.4	−84	23	5.90	4.0	5.88	6071,6731,6732,6734,6766,6767	*15*,*18*,11,*01*,*19*,02,01,*03*,04,06,10,16	02
5729	15	20.2	−84	9	5.66	4.1	5.67	6731,6733,6734,6734,6766,6767	*07*,*03*,*20*,*05*,01,02,03,07,00,10,10,03	*01*

H. R.	R. A. 1900.		Dec. 1900.	H. R. Magn.	Path.	Obs. Magn.	Julian Days.	Residuals.	Resid.
	h.	m.	° ′						
6020	16	5.4	−78 24	4.78	8.8	4.67	6733,6736,6784,6785	*20*,20,*11,19*,03,13,03,11	01
6021		5.5	−78 25	5.22	8.9	5.27	6733,6736,6784,6785	12,09,*10,19*,19,*02,08,04*	*05*
6102		18.1	−78 41	3.90	8.5	3.95	6738,6797,6798,6799,6801,	09,22,09,*14*,04,00,07,*18,11,04*	*05*
6163		28.8	−77 18	4.16	10.8	4.32	6797,6798,6799,6801	*08*,04,*02,28*,09,16,09,*04*	*16*
6429	17	12.8	−80 46	5.93	6.2	5.94	6766,6767,7124,7125	*01,04,24*,05,10,02,*04*,18	*01*
6721		56.1	−87 40	5.22	2.9	5.22	6767,6784,6785,6797,6798, 6799,6801,6802,6808,7124, 7125	08,00,24,*03*,02,*06,12,22*,13,*01*, *16*,03,18,*08,07,14,14,09*,24,14, 10,00	00
6731		57.3	−75 53	5.69	14.0	6.61	6766,6784,6797,6798,6801, 6802,6808	*09*,07,*04*,04,*16*,43,*05*,13,*29,15*, *22,24*,26,30	*92*
7785	20	16.6	−81 17	5.81	5.7	5.96	6801,6802,6808	*20*,07,15,27,*12,15*	*15*
7812		21.4	−81 37	5.76	5.5	5.84	6808	*01*,02	*08*
7863		29.7	−76 32	6.14	12.4	6.41	6216,6578,6580,6589	17,28,06,*21,02,41*,09,04	*27*
7864		29.8	−75 42	6.56	14.5	6.75	6580,6589	02,*06*,10,*07*	*19*
8021		52.6	−77 24	5.24	10.6	5.26	6216,6578,6584,6587,6591, 6961	*03*,05,32,*07*,19,21,08,14,*21,21*, *22,31*	*02*
8254	21	30.4	−77 50	3.74	9.8	3.78	6578,6584,6587,6946,6960, 6961,6965	03,18,09,13,*09,20,30,10*,11,12, *05*,39,*18,09*	*04*
8280		35.6	−83 10	5.38	4.6	5.26	6591,6946,6960,6965	*06*,04,23,04,00,*12*,00,*16*	12
8380		53.2	−76 36	5.91	12.3	6.20	6591	02,*01*	*29*
8471	22	8.1	−78 1	5.63	9.5	5.70	6216,6241,6584,6587,6589,	*20,50,06,07*,29,14,07,03,19,12	*07*
8481		8.8	−80 57	5.11	6.0	5.00	6216,6241,6242,6243,6584	00,*01*,03,00,21,00,*02*,03,*09,18*	11
8505		12.6	−86 29	5.74	3.3	5.72	6242,6580,6587,6589	02,00,14,07,14,07,*29,16*	02
8630		35.8	−81 54	4.34	5.3	4.23	6243,6244,6246,6247,6578, 6979,6981	06,05,15,*02*,17,01,*05,08,01,07*, *15,10*,03,*04*	11
8663		41.0	−80 39	5.52	6.3	5.50	6244,6246,6247,6977,6979, 6981	08,10,*04,05*,07,*03*,36,39,*08,11*, *31,33*	02
8786	23	0.2	−80 1	6.20	6.9	6.30	6249,6250,6257	01,12,*15,04*,07,*01*	*10*
8862		13.2	−88 2	5.56	2.9	5.36	6249,6250,6257	*09,05*,08,00,04,04	20
8935		26.9	−77 57	5.78	9.6	6.10	6242,6250,6981	*18,11*,10,02,14,06	*32*
8995		38.6	−79 21	5.68	7.6	5.88	6243,6244,7325	00,08,12,*04,04,10*	*20*
9032		46.2	−82 35	5.10	4.9	5.11	6216,6241,6247,6965,6977, 6979,7325,7326	06,*09*,06,*08,01,15,14*,09,*10,07*, 22,00,*01*,06,07,07	*01*
9061		52.1	−82 44	5.68	4.8	5.69	6241,6246,6965,6977,7326	13,04,08,*14,02*,63,*18,19,22,13*	*01*
9084		56.4	−77 37	4.73	10.2	4.64	6249,6981	04,*12*,14,*08*	09

The observations of the stars north of declination +65°, which were used for determining the northern atmospheric absorption, are contained in Table III. The form is the same as that of Table II. The number in the Revised Harvard Photometry, the right ascension for 1900, the declination for 1900, and the magnitude taken from the Revised Harvard Photometry are given in the first four columns. The length of path traversed by the light of the star is given in the fifth column. The magnitude derived from the measures contained in this volume is given in the sixth column. The Julian Days and residuals are given in the next two columns. The residual found by subtracting the magnitude in the sixth column from that in the fourth is given in the ninth column.

TABLE III.

STARS NORTH OF DECLINATION +50°.

H. R.	R. A. 1900.	Dec. 1900.	H. R. Magn.	Path.	Obs. Magn.	Julian Days.	Residuals.	Resid.
	h. m.	° ′						
21	0 3.8	+58 36	2.42	2.7	2.31	6027,6068,6071,6072,6732, 6733,6734	*04,09,11*,01,11,13,18,01,01,01, 05,*16,04,11*	11
130	27.3	+62 23	4.24	3.8	4.30	6038,6731,6733,6736,6738	04,01,*15,07,08*,02,19,15,04,*13*	*06*
264	50.7	+60 11	2.25	3.1	2.25	6038,6079,6736,6737	*04,02,01,10,01,13,05*,33	00
343	1 5.0	+54 37	4.52	2.1	4.43	6068,6071,6072,6079	10,*05 02,05*,16,*02,10,04*	09
403	19.3	+59 43	2.80	3.0	2.68	6039,6071,6072,6737,7474, 7475,7476	04,*03*,09,13,16,*04,05,13,21*, R, 07,03,*04*,03	12
502	38.2	+56 36	6.18	2.4	6.27	6039,6731,7474,7475,7476	*04*,09,*18,06*,28,16,04,*14,07,07*	*09*
542	47.2	+63 11	3.44	4.1	4.42	6736	22,*21*	*98*
785	2 35.8	+54 41	5.66	2.1	5.72	6068,6079,6734,6737,7124, 7125,7466	23,21,17,08,*04,09,03,02,01,13*, *08,31* R, R	*06*
860	48.0	+61 7	5.63	3.4	5.64	6068,6072,6079,7124,7125, 7466	08,03,*10,12,05*,02,*05*,08,06,03, R, R	*01*
1105	3 33.5	+62 54	5.32	4.0	5.33	6731,6732,6733,6766,6767	*23,15,28,06,26,18*,45,R, 57,11	*01*
1204	48.6	+62 47	4.87	4.0	5.15	6731,6732,6733,6734,6766	02,05,*11,01,09*,17,*03*,01,*05*,00	*28*
1305	4 8.1	+61 36	5.64	3.5	5.81	6733,6736,6767,6784,6785	*10,06,16,17*,02,00,38,30,*13,05*	*17*
1342	13.7	+56 16	5.90	2.3	5.81	6736,6784,6785	*13*,03,09,01,02,00	09
1603	54.5	+60 18	4.22	3.1	4.07	6766,6767,6797,6798,6799, 6801,7124,7125	*04,01,18,38*,00,19,*17*,00,*33,44*, 20,07,19,03,50,33	15
1719	5 10.8	+58 1	6.23	2.6	6.15	6797,6798,6799,6801,7124, 7125	10,25,*15,03,29,32*,19,14,05,21, 00,*12*	08
1802	20.7	+62 59	5.75	4.1	R	6785	R, R	
2215	6 8.7	+61 33	5.30	3.5	5.14	6766,6767,6784,6797,6798, 6799,6801,6802,6808	*08,23*,16,02,*34,33,17,29*,23,33, 65,53,*14,26*,00,*05,04,07*	16
2402	29.2	+56 56	5.75	2.4	5.95	6784,6797,6798,6799,6801, 6802,6808	*20,24*,11,*05*,09,07,24,33,*01*,02, *03*,03,*25,09*	*20*
2644	57.7	+52 53	6.19	1.8	5.95	6785	*01*,01	24
2715	7 7.2	+59 49	5.33	3.0	5.40	6797,6798	09,*05,02,02*	*07*
3039	44.6	+55 29	6.24	2.2	6.34	6801,6802,6808	03,00,*04,03*,00,03	*10*
3277	8 16.2	+53 33	5.58	1.9	5.57	6802,6808	*05,06*,11,00	01
3648	9 6.4	+61 50	5.23	3.6	5.28	6216,6584,6587,6589,6591	*07*,04,19,09,*19,13,01*,09,02,*08*	*05*
3662	9.0	+54 26	4.89	2.0	4.86	6216,6584,6589,6591,6946, 6960,6961	15,*01,10,03*,06,*05*,00,12,08,01 *14,14,05*,08	03
3757	23.7	+63 30	3.75	4.3	3.91	6587,6961,7326	00,*04*,09,01,*09*,05	*16*
3855	36.3	+54 50	6.27	2.0	6.38	6578,6584,6589,6960	01,13,*02*,01,*14*,16,03,*20*	*11*
3888	43.9	+59 31	3.89	2.9	3.82	6580,6584,6589,6591,7325	05,*07,09,16,13,16*,04,07,03,42	07
4131	10 27.5	+54 0	6.39	2.0	6.49	6216,6241,6242,6243,6244, 6246,6247,6578,6580,6587, 6981	19,02,16,07,19,*03,05,19*,04,*01*, 13,14,*18,03*,08,*15*,02,*04,07,11*, *14*,01	*10*
4301	57.6	+62 17	1.95	3.8	1.82	6216,6241,6242,6244,6246, 6249,6250,6257,6578,6965, 6977,6979,6981	22,13,03,*07*,34,18,*02,09*,00,00, 01,*25*,08,06,*06,11,01,23*,04,*09*, 11, R, 00,*21*,04,*10*	13
4344	11 6.9	+55 26	6.48	2.2	6.56	6246,6249,6250,6257,6965, 6977,6979,6981	*02,08*,01,12,*03*,07,20,07,00,05, *05*,03 *31 01,07*,08	*08*
4521	41.6	+56 11	5.41	2.3	5.24	6216,6241,6242,6243,6244,	*02,20,15,14,08,09,08*,00,13,*18*,	17

H. R.	R. A. 1900.	Dec. 1900.	H. R. Magn.	Path.	Obs. Magn.	Julian Days.	Residuals.	Resid.
	h. m.	° ′						
						6247,6250,6965,6977,6979,6981,7325,7326	*24,24*,10,*05*,08,38,00,09,*10*,09,22,22,03,00,25,*12*	
4610	12 0.6	+63 30	6.24	4.3	6.21	6246,6249,6278,6977,6979	*22,08,18,07,23,34*,01,10,36,61	03
4859	43.0	+63 20	5.83	4.2	5.84	6243,6960,6961,7006	29,23,*26*,07,*12,09,08,05*	*01*
4917	51.9	+54 39	5.84	2.1	5.79	6243,6946,6960,6961,7006	02,06,*15*,13,04,43,04,*22,21,16*	05
5085	13 24.8	+60 28	5.41	3.2	5.47	6241,6246,6247,6249,6257,6946,7003,7006,7017	01,02,10,02,11,*02*,26,21,09,*11,03,04,20,24,07*,00,*03,01*	*06*
5142	35.7	+53 26	5.28	1.9	5.42	6241,6250	03,04,04,*12*	*14*
5213	46.5	+61 59	6.05	3.7	6.10	7006,7017,7018,7019,7020,7387,7388,7389	26,08,*09,18,21,14,22,37,07*,44,23,39,10,*21,06*,06	*05*
5372	14 15.6	+55 20	6.52	2.2	6.42	6242,6243,6278,6309,7003,7387	21,*10*,06,11,11,*01*,07,14,*01,34,14,11*	10
5492	39.5	+61 41	6.17	3.5	6.25	5945,5946,6244,6246,6309,7018,7019,7020	13,08,*05,12*,19,18 *11,05,01*,09,*07,05*,15,*08,08,26*	*08*
5715	15 17.2	+52 17	5.52	1.7	5.74	5941,5945,6247,6257,7003,7017	05,04,*14,04,03*,14,05,01,*18*,01,04,01	*22*
5744	22.7	+59 19	3.47	2.9	3.40	5941,6249,6257,7003,7017,7028,7030,7033	*22,10*,02.05,*12,25*,23,57,*08,22,26*,54,08,*06,22*,02	07
5886	45.1	+62 55	5.13	2.2	5.22	5961,6278,6317,7018,7019,7028,7030,7033,7389	*13,13*,30,08,08,04,18,28,*10*,14,*18,11*,07,01,*09*,09,*17,38*	*09*
5960	55.4	+55 2	4.96	2.1	4.96	5946,6278,6317,7018,7019,7020,7035,7389	12,04,*03*,14,*21,07,13,23,01* 06 *12,05*,25,10,03,14	00
5986	16 0.0	+58 50	4.11	2.8	4.06	7020,7035,7387,7388	03,05,*01,07,08,05*,16,*07*	05
6127	22.2	+55 26	5.66	2.2	5.73	5946,5970,5974,7411,7414	*18,10*,00,05,05,09,00,28,*17,03*	*07*
6132	22.6	+61 44	2.89	3.6	2.84	5945,5963,5970,5973,5974,7059,7411,7413,7414	*12,16,18,14,01*,01,*09*,15,08,19,36,31,*32,14*,19,29,*25,18*	05
7369 7370	17 3.2	+54 36	5.06	2.1	4.92	5941,5981,5982,6309,7030 7059,7413	13,07,06,01,*01,11,21,13,05,07,07*,11,20,05	14
6421	11.7	+62 59	5.47	4.1	5.67	5981,5982,6309,7030	08,16,*05,24*,05,04,07,*11*	*20*
6573	33.9	+61 58	5.31	3.6	5.30	6725,7028,7077,7414	19,05,00,*06,26*,05,*05*,07	01
6618	41.9	+53 50	5.70	1.9	5.78	5946,5963,5995,6724,7028,7033,7076,7077,7411,7414	03,01,22,00,*02,08,17*,01,*05,07*,08,12,*23,06,04,03,04,06*,34,00	*08*
6978	18 30.9	+56 58	4.95	2.4	4.79	5945,5946,5970,5974,6006,7033,7035,7390,7391,7410,7413	06,*04,04*,03,*16,05,07,18,05,10*,07,13,10,*10*,17,12,18,*11*,15,*17,02*,01	16
7049	40.7	+55 26	5.08	2.2	5.05	5945,5961,5973,5974,5981,5982,5995,6009,6725,7035,7059,7390,7391,7410,7413	15,00,*09*,00,06,*01*,07,15,*01*,01,*09,04,02.09,02,05,15*,00,17,11,*22,12*,07,*01,07,02*,11,07,*08*,04	03
7608	19 51.2	+57 16	5.04	2.5	5.15	5961,5970,5982,5995,6006,6008,6009,6010,6015,7076,7077,7471,7472,7473	*05,02*,15,14,24,05,*04,04,06*,02,*07,23,06*,02,02,*07,02*,07,*11,02,16*,03,*12*,04,12,*08*,09,05	*11*
7781	20 15.9	+55 5	5.71	2.1	5.70	5974,5982,6008,6010,6015,7077,7110,7111,7390,7391,7410	05,04,*02*,08,03,*20*,05,*21,04,13*,01,05,03,*18*,08,*05*,05,*02*,12,24,*12*,12	01
7850	27.9	+62 39	4.28	3.9	4.39	5981,6008,7105,7108,7110,7111,7390,7391,7410,7471,7472,7473	02,*06*,36,21,12,24,01,14,*12,05,05,12*,00,*18,11,15*,10,*11,01,08*,10,*14,04,17*	*11*
7957	43.3	+61 27	3.59	3.5	3.45	5981,6008,6022,7105,7107,7108,7112,7471,7472,7473	*18,20,16,15,05*,00,*10,19*,23,31,05,07,31,13,*06*,15,*13,02,10*,00	14
8065	59.4	+56 16	5.74	2.3	5.78	5995,6022,7107,7108,7112	19,*05*,16,13,*24,03*,09,*07,14*,01	*04*

H. R.	R. A. 1900.	Dec. 1900.	H. R. Magn.	Path.	Obs. Magn.	Julian Days.	Residuals.	Resid.
	h. m.	° ′						
8162	21 16.2	+62 10	2.60	3.7	2.54	5995,6015,6019,7105,7108	*09*,*04*,10,*10*,17,13,*22*,11,*21*,12	06
8226	25.7	+54 59	6.06	2.1	6.09	6008,6015,6019,7105,7107, 7475,7476	01,10,*03*,*08*,*06*,*13*,12,07,10,*23*, 01,03,16,*13*	*03*
8334	42.6	+60 40	4.46	3.2	4.32	6006,6009,6022,6030,7107	22,24,*19*,23,*36*,*31*,*09*,*07*,08,30	14
8535	22 19.3	+56 47	6.19	2.4	6.13	6006,6015,6019,6022,6027, 6030,7110,7111,7474,7475, 7476	13,10,20,09,*16*,02,02,*16*,22,11, *03*,12,*26*,*24*,*23*,*07*,06,*18*,19,*05*, 10,08	06
8627	35.1	+63 4	5.21	4.1	5.30	6009,6019,6027,6030,6038, 7110,7111	07,*20*,*08*,03,*18*,*12*, R, R, R, R, 30,14,08,01	*09*
8808	23 3.7	+63 6	6.19	4.1	6.18	6030,6038,6039,7466	20,24,*01*,02,*05*,18,*24*,*36*	01
8822	5.4	+58 47	5.63	2.8	5.83	6022,6039,7112,7466	42,31,*20*,*23*,*31*,*19*,04,16	*20*
9071	53.9	+55 12	4.93	2.1	4.96	6027,6068,6071,6072,6734	13,*03*,*19*,*10*,00,17,08,16,*02*,*25*	*03*

REMARKS.

403. J. D. 7474. Second set rejected. Wrong quadrant.

542. J. D. 6736. Rejected for discordance in determining northern absorption.

785. See page 5. Residuals *110* and *117*.

860. See page 5. Residuals *145* and *171*.

1105. J. D. 6766. Second set rejected for discordance, residual 100.

1802. J. D. 6785. Magn. 6.17 and 6.89. Rejected for discordance.

4301. J. D. 6977. Second set rejected for discordance, residual 96.

8627. J. D. 6030. Residuals 129 and 121 rejected for discordance. J. D. 6038. Residuals 112 and 122 rejected for discordance. A portion of the light was cut off by foliage.

The magnitudes derived from the measures made with the Meridian Photometer, during the years 1902 to 1906, are contained in Table IV. The number of the star in the zone of the Durchmusterung is given in the first column. The Bonn Durchmusterung is used for stars north of declination −23°, in 1855, the Cordoba Durchmusterung for other stars north of declination −52°, in 1875, and the Cape Photographic Durchmusterung for stars south of declination −52°, in 1875. The zone is generally the same as the degree of declination given in the third column, but when they differ, owing to precession, the number in the first column is placed in Italics, and the nearest adjoining zone is to be taken. For stars in right ascension between 6^h and 18^h, the northern zone should be taken, for other stars, the southern zone. The right ascension and declination for 1900 are given in the second and third columns. The magnitude in the Durchmusterung is given in the fourth column, and the magnitude derived from the measures with the Meridian Photometer in the fifth column. The Julian Days and corresponding residuals are given in the sixth and seventh columns. In general, there are two residuals for each Julian Day, as ordinarily two sets of four settings each were made on each evening.

TABLE IV.

GENERAL CATALOGUE.

DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.
			DM.	Phot.		
	h. m.	° ′				
4	0 5.5	−82 47	6.3	5.22	6038,6039, 6068,6071, 6072,6079, 6734,6736, 6737,6738	*12,05*,16,09, *01*,04,00,*10*, 01,*07*,09,11, *03,01,07,01*, 05,00,05,*15*
42	6.6	−35 42	5.4	5.32	6038,6039, 6068,6071, 6072,6079, 6731,6736, 6737,6738	05,*15*,07,*01*, *10,06*,00,*06*, 07,*02*,09,10, 12,*03*,06,18, 11,06,*17,21*
23	10.0	+26 43	6.5	6.32	6038,6068, 6072	*03,17*,07,*06*, 25,*03*
35	11.5	+36 5	7.1	6.97	6039,6071, 6733	12,06,*05,07*, 01,*09*
4	11.7	−70 57	7.2	7.25	6731,6736, 6737	02,06,07,04, 01,*18*
50	11.9	+47 24	6.0	5.79	6039,6072, 6738	06,17,08,17, *31,19*,
49	17.1	− 5 45	7.0	7.14	6039,6068, 6071,6732, 6734	13,03,10,*04*, *09,03*,00,*02*, *02,10*
46	21.1	+ 3 16	7.4	6.97	6039,6071, 6732	19,13,00,*04*, *13,15*
101	21.3	−44 14	3.9	4.08	6038,6039, 6068,6071, 6072,6079, 6731,6736, 6737,6738	01,*09*,06,04, *05,01,09,11*, 20,01,13,04, 02,*03*,16,13, *08*,02,*12,20*
59	22.3	+15 28	6.7	6.45	6038,6039, 6738	*06*,10,22,15, *23,17*
84	24.8	−15 25	6.2	6.17	6038,6068, 6072,6732, 6737	*03*,03,06,*03*, 08,01,*01,09*, *04*,06
179	25.4	−24 21	5.2	5.28	6039,6071, 6731,6733, 6738	14,03,*02,02*, 21,06,*08*,06, *08,14*
20	29.2	−71 49	6.6	6.16	6038,6039, 6068,6071, 6072,6079, 6731,6736, 6737,6738	*09*,06,04,10, 03,00,00,*07*, R,*17*,05,06, *04,14*,21,04, *07,08*,08,*08*
117	29.7	−52 56	6.4	5.57	6038,6039, 6068,6071, 6072,6079, 6731,6736, 6737,6738	*02*,08,20,12, 11,11,*05,15*, 15,06,05,10, *04,06,02*,08, *04,19,37,20*
39	0 31.7	−73 47	8.4	7.92	7474,7475, 7476	*16*,03,*09,11*, 21,12
53	34.5	−74 31	7.5	7.41	7466,7474, 7475,7476	09,10,14,09, 00,*15,19,09*
42	34.8	−73 42	6.9	6.78	7466,7474, 7475,7476	*03,25*,21,13, 00,03,*08,04*
55	36.2	−74 19	8.3	8.51	7474,7475, 7476	*10*,05,*02,15*, 20,02
47	38.2	−66 1	6.0	5.40	6038,6039, 6068,6071, 6072,6079, 6731,6736, 6737,6738	01,*09*,21,18, *03*,13,*03,01*, 04,*01*,24,05, *16,05*,08,00, 02,*06,25,26*
58	38.2	−74 14	9.4	9.57	7466	10,*10*
59	39.8	−74 17	9.4	9.13	7466,7474, 7475,7476	04,*06*,09,*03*, 23,*25,09*,07
44	40.3	−72 55	9.2	9.68	7466,7474, 7475,7476	34,20,11,02, *25,18,08,15*
61	40.5	−74 23	8.7	8.80	7474,7475, 7476	17,*10,12*,23, *17,04*
62	40.7	−72 48	9.2	9.89	7474,7475, 7476	*07*,02,09,14, *05,12*
65	42.8	−72 46	9.2	9.97	7475,7476	14,*35*,14,06
110	43.0	+ 8 41	7.7	8.02	6732,6733, 6734	03,*06*,21,03, *05,18*
90	43.1	+ 9 43	9.0	8.82	6732,6733, 6734	09,06,02,*05*, *02,09*
102	45.0	+11 18	8.6	8.91	6732,6733, 6734	*02*,09,03,*09*, 10,*11*
97	45.4	+ 9 52	8.5	8.46	6732,6733, 6734	01,08,03,*02*, *16*,05
68	45.8	−74 2	9.0	8.78	7466,7474, 7475,7476	11,*11,08,06*, *19*,02,11,17
68	46.5	−72 2	9.0	9.60	7466,7474, 7475,7476	17,04,04,*13* *20*,13,*02,05*
99	46.9	+10 3	8.3	8.36	6732,6733, 6734	*05,12*,16,02, 07,*07*
101	47.6	+ 9 16	8.3	8.46	6732,6733, 6734	00,05,04,02, *14*,03
376	47.7	−24 33	5.7	5.56	6039,6068 6071,6731, 6736,7474, 7475,7476	*04,16,02,27*, *02,24,22,23*, *07,12,08*,29, 48,46,28,02
105	48.6	+10 35	8.4	8.76	6732,6733 6734	04,*02*,00,*03*, 09,*10*
108	49.8	+12 19	8.2	8.30	6732,6733,	16,*03,07*,12,

DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.
			DM.	Phot.		
	h. m.	° ′				
					6734	*16*,01
151	0 50.6	+26 40	6.0	6.16	6039,6068, 6071	10,*03*,*03*,00, 01,*06*
118	51.3	+12 11	8.8	9.13	6732,6733, 6734	*18*,15,10,12, *09*,*09*
130	51.5	+14 14	8.7	8.58	6732,6733, 6734	07,*03*,*01*,15, *11*,*07*
110	51.6	+ 9 29	8.7	8.78	6732,6733, 6734	*06*,*07*,03,07, 06,*03*
120	52.1	+11 54	8.2	8.33	6732,6733, 6734	*02*,*06*,*01*,*12*, 09,11
143	54.5	+14 5	8.5	9.00	6732,6733, 6734	*03*,*03*,*12*,08, *05*,15
115	56.0	+10 39	8.2	8.18	6732,6733, 6734	*03*,04,*17*,08, *04*,11
135	56.1	+11 23	8.0	7.82	6732,6733, 6734	*10*,04,03,04, 06,*08*
150	57.3	+13 43	8.5	8.93	6732,6733, 6734	08,*06*,*11*,14, 00,*07*
59	57.6	−73 14	8.5	8.03	7466,7474, 7475,7476	63,31,*12*,*02*, *10*,*22*,*21*,*25*
410	57.7	−32 6	5.6	5.60	6038,6039, 6068,6071, 6072,6079, 6731,6736, 6737,6738, 7474,7475, 7476	*12*,*01*,14,*06*, 23,05,*03*,*11*, 21,18,05,*04*, *10*,*11*,15,09, 09,*02*,*04*,*04*, 03,*10*,01,*18*, *15*,*11*
154	57.8	+15 36	8.5	8.58	6732,6733, 6734	*05*,05,*05*,*04*, *05*,17
75	57.8	−72 5	9.1	9.54	7466,7474, 7475,7476	08,40,*10*,*18*, *07*,*05*,08,*13*
126	57.9	+12 31	7.8	8.09	6732,6733, 6734	*04*,14,07,06, *16*,*05*
155	58.6	+13 24	8.7	8.83	6732,6733, 6734	*06*,00,*02*,*17*, 17,06
168	1 0.5	+14 27	9.0	9.25	6732,6733, 6734	*07*,12,*16*,05, *02*,09
169	0.7	+14 51	7.7	7.25	6732,6733, 6734	*29*,*03*,02,04, 14,14
83	0.9	−74 0	9.0	9.02	7466,7474, 7475,7476	03,*11*,11,17, *02*,*10*,*01*,*06*
159	1.1	+15 47	8.5	8.30	6732,6733, 6734	*14*,*04*,07,02, 06,00
79	1.1	−72 47	8.5	8.58	7466,7474, 7475,7476	01,*05*,05,16, 09,*15*,*07*,00
83	1.8	−72 16	8.0	7.42	7474,7475, 7476	22,24,*12*,*25*, *03*,*03*
63	2.1	−73 5	8.0	8.18	7466,7474, 7475,7476	01,27,03,*07*, 10,*27*,01,*09*
234	1 2.2	+43 24	5.2	5.12	6039,6072, 6079	*04*,*17*,09,01, 16,*08*
116	2.6	+16 53	8.0	7.64	6732,6733, 6734	*19*,02,*08*,14, *04*,12
164	2.6	+15 20	8.0	8.10	6732,6733, 6734	*20*,04,06,*02*, 04,06
119	3.2	+17 8	8.6	8.26	6732,6733, 6734	00,*11*,06,08, *07*,04
190	3.2	+ 5 7	6.0	5.56	6068,6079, 6731	*06*,*15*,05,*04*, 12,09
391	3.2	−42 1	5.4	5.30	6038,6039, 6068,6071, 6072,6079, 6731,6736, 6737,6738	*09*,*10*,18,*09*, 04,05,*04*,*02*, 23,08,04,*13*, 01,*05*,04,07, 03,*10*,*06*,*04*
241	4.2	−55 47	3.2	4.12	6038,6039, 6068,6071, 6072,6079, 6731,6736, 6737,6738	29,19,13,*03*, 39,38,*16*,*14*, 05,*07*,*01*,*21*, *08*,*38*,*12*,*07*, 00,*20*,01,*06*
84	4.6	−74 28	8.6	9.43	7474,7475, 7476	13,*06*,*07*,*06*, *06*,11
65	5.2	−73 33	9.1	9.26	7466,7474, 7475,7476	*04*,06,09,02, *15*,10,*02*,*03*
201	5.5	+37 12	6.0	5.84	6071,6079, 6736	04,07,06,*05*, *10*,01
85	5.5	−72 22	8.5	8.70	7466,7474, 7475,7476	10,08,06,04, *26*,*07*,00,03
166	5.7	+17 52	8.8	8.59	6732,6733, 6734	*09*,*34*,40,30, *15*,*13*
123	5.8	+16 15	8.5	8.26	6732,6733, 6734	*06*,03,08,13, *05*,*13*
175	6.0	+14 10	8.2	8.05	6732,6733, 6734	*06*,00,06,12, *07*,*05*
67	7.0	−73 29	6.8	7.16	7466,7474, 7475,7476	08,22,13,*07*, *13*,*02*,*19*,*06*
175	7.5	+16 14	8.5	8.46	6732,6733, 6734	10,*18*,02,*01*, 09,*03*
69	8.1	−73 33	9.0	9.37	7466,7474, 7475,7476	10,14,*07*,13, *03*,*14*,*01*,*10*
177	8.8	+15 36	6.5	6.03	6068,6079, 6731	20,02,*13*,*05*, *03*,*02*
210	10.5	+ 0 23	6.8	6.82	6068,6071, 6079,6736	10,*04*,01,*11*, *03*,*06*,*03*,18
90	10.7	−73 52	9.3	10.07	7474,7475, 7476	02,38,*42*,*43*, 20,25
129	10.9	+17 7	8.3	8.42	6732,6733, 6734	*03*,00,04,12, *11*,00
185	12.2	+15 50	8.8	8.74	6732,6733, 6734	*17*,07,*04*,24, *12*,04

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183	1 13.0	+18 4	8.0	7.86	6732,6733, 6734	*15*,*07*,12,15, *16*,09
262	21.9	−13 34	6.0	5.56	6068,6071, 6072,6079, 6731,6736, 6737,7474, 7475,7476	09,*09*,04,*02*, *07*,*10*,*02*,09, *13*,*09*,*11*,05, 08,12,05,13, *01*,*07*,*10*,13
341	32.5	+44 54	7.0	6.41	6071,6079, 6731	04,10,*10*,*09*, 05,02
272	34.1	−21 47	6.0	5.60	6068,6071, 6072,6079, 6731,6736, 6737,7474, 7475,7476	09,10,06,*03*, *03*,03,*01*,*06*, *05*,*09*,*01*,04, 12,04,15,*08*, *27*,*14*,00,13
297	36.3	+34 44	6.0	5.68	6068,6731, 6736	*07*,11,*02*,05, 13,*17*
650	37.6	−37 20	5.9	5.80	6039,6068, 6071,6072, 6079,6731, 6734,6736, 6737,6738, 7466,7474, 7475,7476	12,12,05,*04*, *10*,*03*,08,03, *05*,01,12,10, *30*,*24*,15,*02*, *09*,*04*,05,*02*, 06,*15*,09,09, 04,*14*,*04*,22
275	40.4	+ 8 4	7.3	6.66	6071,6072, 6079	11,06,*05*,08, *12*,*07*
377	42.3	−54 1	5.2	5.14	6039,6068, 6071,6072, 6079,6731, 6734,6736, 6737,6738	06,*02*,21,10, *01*,05,*20*,*13*, 01,09,00,*01*, *13*,*04*,12,07, *09*,*07*,*18*,17
203	42.8	+16 27	6.0	5.93	6068,6072, 6079	05,*04*,12,11, *09*,*14*
300	42.9	−21 20	6.4	6.62	7466	*01*,02
305	43.8	+26 0	6.5	6.72	6071,6072, 6737	10,07,21,*02*, *14*,*20*
336	48.1	−17 26	6.2	5.84	6068,6071, 6072,6731, 6734,7466	03,07,*10*,*15*, *03*,*14*,14,01, 05,00,13,*03*
583	50.2	−43 0	5.5	5.23	6039,6068, 6071,6072, 6079,6731, 6734,6736, 6737,6738	16,03,05,15, 01,*04*,01,*06*, 00,04,*02*,*06*, *14*,*02*,21,04, *04*,00,*11*,*14*
307	58.1	− 0 21	6.0	5.51	6071,6072, 6734,6736, 6737	02,*21*,*01*,13, *14*,*13*,16,08, 10,03
324	2 0.7	+20 7	7.7	7.51	6732,6733, 6734	*15*,*02*,00,16, 02,00
298	6.6	+21 32	8.5	8.45	6732,6733, 6734	*13*,*03*,*10*,13, *04*,15

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304	2 9.3	+22 9	7.8	7.84	6732,6733, 6734	*10*,*10*,*04*,19, 06,*04*
317	12.0	+22 12	8.3	8.54	6732,6733, 6734	05,25,*15*,*13*, 01,*06*
589	12.8	+46 1	6.3	6.16	6071,6072, 6736,7124	*10*,*06*,03,*05*, 07,*07*,24,*07*
321	12.9	+21 26	8.0	7.68	6732,6733, 6734	*04*,03,*04*,03, *04*,09
346	14.9	+19 40	8.5	9.09	6732,6733, 6734	00,*14*,*03*,00, 11,07
331	15.5	+22 58	7.8	7.75	6732,6733, 6734	07,08,*13*,04, *01*,*07*
1038	18.0	−24 16	5.4	5.23	6068,6736, 6737,6738, 7124	01,*06*,05,*05*, 07,01;*07 11* 16,*03*
388	18.1	+20 57	8.5	9.06	6732,6733, 6734	10,*06*,*15*,04, 02,06
571	19.4	−51 33	6.2	5.98	6068,6071, 6072,6079, 6731,6732, 6733,6736, 6737,6738	14,10,14,13, 04,01,06,09, *10*,*06*,*09*,*19*, *31*,*18*,09,02, 04,07,*04*,01
316	19.5	+10 9	5.7	5.58	6071,6737, 6738,7124	06,09,*03*,09, *10*,*22*,*02*,12
451	21.1	−12 44	4.7	4.94	6071,6736, 6737,6738, 7124	06,*05*,10,00, *09*,09,*07*,*06*, *02*,07
347	21.2	+22 25	7.8	8.08	6732,6733, 6734	*08*,*01*,08,05, *13*,10
199	22.1	−60 45	5.9	5.35	6068,6071, 6072,6079, 6731,6732, 6733,6736, 6737,6738	10,11,12,01, 06,05,13,04, 16,05,03,*15*, *41*,*41*,17,04, 09,16,*10*,*17*
326	22.5	+24 11	8.6	8.58	6732,6733, 6734	01,*04*,*20*,12, 05,05
637	23.3	−48 9	4.2	4.30	6068,6071, 6072,6079, 6731,6732, 6733,6736, 6737,6738	18,01,01,07, 00,07,11,*04*, *01*,12,*08*,18, *25*,*27*,12,10, 01,09,*08*,*04*
905	23.8	−34 15	5.2	5.19	6068,6071, 6072,6079, 6731,6732, 6733,6736, 6737,6738, 7124	00,*05*,06,*03*, 13,04,01,03, 05,09,*08*,03, *26*,*26*,14,*12*, 08,02,*09*,*02*, 08,20
378	25.7	− 0 11	6.5	6.10	6068,6071, 6736,6737 6738,7124	11,*09*,*19*,*11*, *05*,01,14,01 *08*,*12*,19,13

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349	2 26.6	+21 53	8.0	7.74	6732,6733, 6734	*01,15*,13,29, *08,18*
369	28.8	+24 27	8.2	8.26	6732,6733, 6734	*02*,05,*06,07*, 06,01
368	28.9	+22 32	8.1	8.29	6732,6733, 6734	*04,02*,14,08, *11,03*
372	30.9	+22 37	7.6	8.11	6732,6733, 6734	*06*,13,*18*,16, *03,03*
375	32.0	+22 42	8.3	8.34	6732,6733, 6734	*03*,07,04,*05*, 03,*06*
591	32.3	+37 40	6.5	6.40	6068,6737, 7124,7125	*06,03*,03,09, 13,17,*05,29*
66	33.8	−79 33	6.4	5.17	6068,6071, 6072,6079, 6731,6732, 6733,6736, 6737,6738	14,16,*12*,10, *02*,00,*03*,04, 00,*08,05*,12, *10,07*,07,02, 10,08,*12,26*
443	34.8	+26 38	5.5	5.42	6071,6737, 7124,7125	*09,04*,00,05, *12*,16,*03*,04
457	39.0	+14 53	6.0	5.72	6071,6737, 6738,7125	06,04,*08,05*, *07*,00,05,03
355	43.7	+17 3	5.7	5.29	6072,6736, 6738,7125	20,10,*07*,04, *04,06*,09,*28*
683	50.9	−51 17	6.3	6.07	6068,6071, 6072,6079, 6731,6732, 6733,6736, 6737,6738	09,02,*05,07*, *06*,11,16,02, 14,*11,13,07*, *07,27*,15,05, 03,*05,02*,04
675	53.8	+37 45	7.0	6.16	6734,6737, 7125	*12,16,03*,33, *10*,07
475	54.7	− 2 52	6.2	5.49	6071,6732, 6733,6737, 6738,7125	06,02,*07,01*, *01,09*,15,13, *07*,07,*02,16*
1191	55.2	−25 41	5.9	5.71	6071,6731, 6733,6734, 6736,7125	*04,03*,01,01, *11,01,14,12*, 29,13,01,*01*
1042	55.5	−32 54	6.2	6.32	6068,6071, 6072,6731, 6732,6733, 6734,6736, 6737,6738, 7125	13,20,*04,04*, 32,20,*30*,04, *14,15,17,13*, *01,07*,08,09, 21,03,06,02, *13,13*
477	56.0	+26 4	5.8	5.91	6734,6736, 6738	*12*,00,20,04, *09,05*
420	57.1	+ 3 58	7.3	5.53	6733,6738,	*04,04*,08,*01*,
631	3 5.5	+42 1	6.5	6.08	6732	06,*05*
1025	8.9	−44 47	6.2	5.96	6068,6071, 6072,6731, 6732,6733, 6734,6736, 6737,6738	10,11,*05,10*, 27,13,*13*,04, 02,*21,23,08*, *01,06*,15,13, 04,00,*03,15*
662	3 24.9	−13 1	6.0	5.56	6731,6732, 6733,6734, 6738	16,18,*08,02*, 01,*12,08,17*, 03,06
1071	27.4	−47 43	6.1	5.99	6068,6071, 6072,6731, 6732,6733, 6734,6736, 6737,6738	11,*01,06,05*, 18,26,05,*06*, 01,*18,17,29*, 02,*11*,17,15, 01,08,02,*07*
195	29.8	−66 50	5.8	5.87	6068,6071, 6072,6731, 6732,6733, 6734,6736, 6737,6738	05,*03*,01,00, 18,08,*06*,03, *16,15,25,24*, *05*,09,05,15, 19,09,*03,04*
101	33.6	−78 41	6.2	5.58	6068,6071, 6072,6731, 6732,6733, 6734,6736, 6737,6738	02,*01,03*,02, 12,09,07,01, *14,21*,01,*04*, 07,01,*07,03*, 07,10,00,01
578	36.6	+19 23	5.5	5.64	6733	*01*,02
1430	38.3	−32 15	4.9	5.07	6068,6071, 6072,6731, 6732,6733, 6734,6736, 6737,6738	07,04,05,*12*, 09,*02*,09,04, *09,12,13,22*, *13,01,05*,05, 11,06,19,02
526	39.5	− 1 29	5.8	5.22	6732,6733, 6734,6738, 6766	*06,07,03*,02, *05,01*,06,07, 09,*02*
539	40.3	+ 5 44	5.7	5.32	6734	*01*,01
818	42.3	+43 39	6.2	5.81	6733	*03*,03
1877	43.4	−24 11	5.5	5.20	6732,6733, 6734,6738, 6766	02,03,*14,16*, *05,09*,02,07, 14,12
752	50.6	−12 24	6.1	5.94	6732,6733, 6734,6738, 6766	03,*21*,11,03, *18,03*,12,01, 10,*01*
628	52.0	−52 59	6.5	6.44	6731,6732, 6733,6734, 6736,6738, 6766,6767, 6784,6785	22,10,*18,04*, *09,28,06,22*, 14,17,07,01, *09,12,03,05*, 23,00,18,05
1614	4 14.1	−34 3	3.3	3.64	6731,6732, 6733,6734, 6736,6738, 6766,6767, 6784,6785	09,20,*09,20*, 00,*08*,03,*07*, 10,10,*12*,03, *19*,03,18,16, 04,*11,01,11*
872	14.3	+46 16	5.1	4.97	6767	*05*,05
1856	14.4	−23 13	6.2	6.04	6766,6767, 6784,6785, 6799	*16,06*,05,12, 08,*21*,10,*05*, 19,*05*

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679	4 16.2	−53 6	6.7	6.02	6731,6732, 6733,6734, 6736,6738, 6766,6767, 6784,6785	01,01,*02*,*12*, 08,*05*,*08*,*14*, 12,15,06,03, *01*,*08*,18,08, *02*,*08*,*03*,01
818	18.7	− 3 58	5.5	5.20	6766,6767, 6784,6785, 6799	08,*14*,14,*03*, 07,*16*,02,02, *09*,07
320	19.2	−63 24	8.2	7.89	7124,7125	02,20,*13*,*08*
327	22.9	−63 32	8.8	9.31	7124,7125	17,*09*,*05*,*02*
1013	24.6	+39 48	6.6	6.35	6784	03,*03*
330	25.1	−62 59	8.6	8.67	7124,7125	24,10,00,*33*
332	26.0	−63 2	6.7	6.90	7124,7125	15,00,*02*,*15*
360	26.8	−61 58	8.5	8.28	7124,7125	36,21,*38*,*17*
904	26.9	−13 52	6.7	6.28	6766,6767, 6784,6785, 6801	*13*,*21*,*08*,14 08,02,15,07, *02*,*04*
1567	27.8	−45 10	5.0	5.13	6736,6738, 6766,6767, 6784,6785, 6797,6798; 6799,6801	07,04,*11*,*05*, 05,*07*,08,13, *17*,*05*,00,00, *03*,*01*,*03*,*21*, 11,*01*,16,09
679	28.8	+ 5 21	6.0	5.73	6767,6785, 6801	14,02,*06*,*10*, 03,*03*
1671	35.4	−38 22	9.1	9.44	7124,7125	*02*,*06*,05,04
1583	36.8	−39 0	7.1	7.62	7124,7125	16,*12*,*07*,03
1590	37.6	−39 46	7.5	8.13	7124,7125	33,07,*16*,*24*
1454	37.8	−48 44	6.9	7.18	7124,7125	25,00,*03*,*24*
1703	38.8	−38 44	8.4	8.76	7124,7125	22,13,*03*,*30*
1603	39.3	−39 3	9.6	8.78	7124,7125	*01*,*02*,00,05
1474	41.0	−50 5	9.6	9.32	7124,7125	06,04,04,*15*
566	41.3	−52 27	7.2	6.76	7124,7125	04,01,08,*15*
1492	43.1	−50 14	7.7	7.84	7124,7125	19,08,*08*,*20*
1494	43.4	−50 48	8.6	8.86	7124,7125	14,00,*12*,*04*
1501	44.1	−50 34	9.0	8.81	7124,7125	05,23,*22*,*06*
1512	46.0	−49 58	7.4	7.84	7124,7125	12,05,*07*,*12*
1514	46.1	−50 3	8.1	8.20	7124,7125	*02*,11,*08*,00
1962	47.8	−35 4	6.2	5.80	6736,6738, 6766,6767, 6784,6785, 6797,6798, 6799,6801	06,12,*09*,*09*, *22*,*25*,20,12, 02,06,*05*,00, 10,13,*08*,*04*, *04*,*01*,01,08
760	48.7	−53 38	6.5	5.40	6736,6738, 6766,6767, 6784,6785, 6797,6798, 6799,6801	*09*,01,*07*,*01*, *10*,*01*,*10*,13, 08,05,08,*11*, 14,*01*,07,05, *06*,*13*,01,*01*
1032	57.0	+45 38	6.8	6.49	6785,6799, 6801	*01*,*11*,*03*,10, 08,*05*
2795	59.7	−24 32	5.8	5.61	6767,6784,	02,06,03,*08*,
					6785,6797, 6798	10,03,00,*03*, 01,*10*
998	4 59.9	− 3 11	6.0	6.07	6767,6784, 6785,6797, 6798	12,*09*,*10*,*08*, 09,08,*08*,15, 00,*09*
1641	5 0.2	−49 18	5.5	5.35	6736,6738, 6766,6767, 6784,6785, 6797,6798, 6799,6801	07,07,01,*10*, *05*,*19*,00,*03*, 05,07,*05*,0, 03,*05*,09,*01*, *03*,02,19,*03*
755	2.0	+24 8	5.8	5.53	6784,6785, 6798	12,05,*06*,*10*, 08,*11*
752	4.0	+15 28	5.0	4.82	6766,6784, 6798	*08*,*01*,08,*02*, *02*,06
309	4.0	−71 27	7.9	5.26	6736,6738, 6766,6767, 6784,6785, 6797,6798, 6799,6801	12,*01*,05,02, *05*,*20*,*19*,*03*, 02,*03*,*02*,*04*, 01,06,29,29, *03*,*10*,*01*,07
1092	8.7	−13 3	4.7	4.41	6766,6784, 6797,6798, 6799	00,*07*,09,*02*, 05,00,11,*10*, *08*,04
980	9.7	+34 12	6.7	5.80	6785,6799, 6801	*11*,*16*,11,01, 18,*05*
916	14.0	+ 2 30	6.1	5.25	6784,6785, 6797	*01*,01,*02*,*05*, *09*,15
935	27.7	− 1 40	6.0	5.34	6766,6784, 6785,6797, 6801	07,*09*,06,02, *18*,*14*,*03*,10, 08,09
1178	28.7	+47 40	6.0	6.09	6785,6798, 6801	*05*,*08*,*01*,*01*, 11,04
456	32.4	−64 18	6.1	5.21	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802 6808	00,*17*,*13*,*22*, *02*,01,*08*,01, 05,16,06,19, 01,09,06,11, 01,*12*,*10*,03
902	33.5	+25 50	5.7	5.22	6798,6799, 6801	05,14,05,*11*, *14*,*02*
1207	35.2	+35 35	6.8	6.78	6799,6801, 6808	17,*04*,15,*10*, *16*,*05*
1999	35.5	−40 46	5.7	5.81	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802,6808	*06*,*26*,*27*,*10*, 18,06,03,*04*, *10*,14,*01*,08, 09,*01*,22,26, 00,*10*,*06*,*05*
1194	38.0	−22 25	6.5	5.86	6767,6784, 6797,6798, 6801	*07*,03,*04*,*02*, 01,03,14,*06*, *02*,*01*
2401	38.7	−34 43	5.7	5.28	6766,6767, 6784,6785,	*13*,*05*,*08*,*24*, 10,03,16,02,

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					6797,6798, 6799,6801, 6802,6808	15,08,05,13, *09*,*02*,10,*07*, 08,*10*,00,*07*
1004	5 41.6	+17 42	6.1	5.44	6797,6799, 6808	02,*05*,05,*01*, 07,*08*
1232	42.4	−14 52	4.0	3.50	6766,6767, 6785,6797, 6798	06,*07*,*02*,*11*, 02,01,01,*02*, 12,03
1027	42.6	+ 6 25	5.7	5.20	6797,6799, 6801	*01*,06,12,*08*, *09*,*03*
2511	45.3	−29 4	9.1	9.36	7124,7125	16,27,*18*,*24*
2516	45.4	−29 37	8.3	8.61	7124,7125	28,18,*21*,*24*
2519	45.6	−29 9	9.0	9.77	7124,7125	*03*,23,*08*,*11*
2540	46.9	−29 9	8.3	8.30	7124,7125	*05*,17,*10*,*04*
75	49.6	−84 50	6.0	6.09	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802,6808	06,06,*23*,*11*, 09,00,*17*,*01*, 12,09,03,13, *04*,09,*08*,05, *08*,*06*,13,00
901	50.6	−57 11	7.0	5.79	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802,6808	01,00,*36*,*44*, *05*,*15*,09,13, 12,10,30,17, 03,*04*,15,*07*, 01,*07*,02,03
1203	6 13.2	+17 21	6.5	6.22	6799,6801, 6802	05,08,*03*,*03*, *05*,*03*
2806	17.0	−34 6	6.0	5.52	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802,6808	*18*,*01*,*33*,*10*, 03,*06*,19,14, *06*,*01*,13,*11*, 12,00,02,06, 11,08,08,*08*
1236	18.5	+ 4 39	4.9	4.28	6799,6802, 6808	05,08,*06*,03, *06*,*01*
1072	21.1	−56 19	6.4	5.55	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802,6808	14,06,*22*,*13*, 08,*15*,10,10, 08,*02*,07,02, *06*,*16*,12,03, *08*,00,01,06
1242	21.6	− 1 27	6.5	5.87	6767,6785, 6797,6799, 6801	*18*,*24*,09,31, 07,03,*04*,05, *04*,*08*
1428	22.0	+20 34	6.8	6.18	6799,6801, 6802	*06*,*04*,12,00, *04*,02
2308	23.1	−48 7	5.9	5.75	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802,6808	*16*,06,00,*07*, *01*,*08*,*03*,*09*, *05*,08,21,10, 02,*07*,*08*,19, *05*,*04*,09,*03*
3237	23.2	−25 48	6.5	5.92	6797,6798, 6799,6801, 6808	*01*,*05*,22,*04*, *08*,*04*,14,02, *07*,*08*
1451	6 23.4	+41 28	7.0	6.59	6799,6802, 6808	08,10,*15*,*11*, *03*,10
1324	26.0	+32 31	5.8	5.99	6798,6801, 6802	*23*,*13*,28,31, *10*,*12*
1519	26.0	−13 5	6.3	6.14	6797,6798, 6801,6802, 6808	11,*04*,05,13, *01*,*13*,*07*,03, 04,*09*
720	47.2	−61 50	4.1	3.25	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802,6808	02,*07*,*08*,*19*, 02,02,16,05, 10,13,04,19, 15,*20*,03,*04*, *11*,*16*, R, *10*
1661	51.7	−16 55	6.0	4.36	6784,6797, 6801,6802, 6808	*03*,07,06,*04*, 05,00,*05*,*11*, 18,*14*
1629	52.2	+42 26	6.5	6.61	6801,6802, 6808	15,10,*01*,*11*, *05*,*09*
572	52.6	−70 50	5.0	5.43	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802,6808	*02*,*05*,07,01, *02*,*07*,*12*,01, 02,*02*,21,29, *05*,03,15,*10*, *08*,*10*,03,*10*
3389	54.7	−33 59	5.4	5.07	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802,6808	*22*,12,14,07, *07*,*04*,08,07, *61*,08,18,17, 19,03,*02*,02, 00,05,*08*,*07*
1542	56.0	+25 35	7.0	6.93	6799,6802, 6808	*13*,*20*,09,*01*, 09,14
3911	57.0	−25 4	6.0	5.74	6784,6785, 6797,6798, 6808	11,*09*,11,*01*, 02,*09*,08,11, *03*,*20*
1788	57.9	− 4 6	5.0	5.02	6784,6797, 6801,6802, 6808	06,02,19,*06*, *16*,*17*,03,*03*, 07,01
2929	7 0.9	−42 11	5.5	5.20	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802,6808	*10*,*08*,*02*,*02*, 08,03,13,09, 16,04,15,17, 05,*03*,*03*,02, *05*,*23*,*15*,*15*
1232	2.5	−56 36	5.7	5.17	6766,6767, 6784,6785, 6797,6798, 6799,6801, 6802,6808	*11*,*06*,13,17, 10,02,03,00, *10*,*01*,08,01, 08,02,17,00, *11*,*33*,04,*04*
1397	2.6	+16 5	5.8	5.22	6797,6802	11,16,*07*,*19*
1571	2.7	+36 45	6.8	6.64	6801,6802	09,02,*02*,*07*
1577	6.5	+ 5 50	6.0	6.13	6797,6801	17,12,*10*,*19*
1758	36.3	+ 3 52	7.0	5.88	6797	02,*08*

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			DM.	Phot.		
	h. *m.*	° ′				
3809	7 39.5	−35 49	6.2	5.61	6580,6584, 6784,6785, 6797,6798, 6799,6801, 6802,6808	04,*10*,*13*,14, *02*,06,*03*,*04*, 02,06,25,00, *08*,09,02,01, *22*,*09*,05,*07*
5885	40.4	−24 26	6.4	5.67	6799,6801, 6802,6808	07,21,*08*,*04*, *08*,*24*,13,00
2106	43.3	−11 57	6.0	5.42	6801	03,*03*
3435	44.5	−46 22	5.9	5.24	6578,6580, 6584,6784, 6785,6797, 6798,6799, 6801,6802	*23*,05,*01*,*12*, 08,01,*14*,01, 18,13,*10*,*06*, 12,14,37,12, *02*,*03*,*17*,*24*
1437	46.2	−56 13	7.4	6.28	6578,6580, 6584,6784, 6785,6797, 6798,6801, 6802,6808	12,*05*,24,13, 28,45,*16*,*17*, *06*,03,*02*,*02*, 26,*03*,*15*,*11*, *29*,*20*,*13*,*15*
2379	55.8	− 2 36	6.8	6.52	6801	11,*11*
985	8 13.8	−62 37	6.0	5.21	6578,6580, 6584,6587, 6589,6591, 6799,6801, 6802,6808	*06*,*01*,*05*,05, 04,*02*,19,*18*, *12*,*20*,02,07, 15,40,02,09, *36*,*08*,05,*04*
4513	17.5	−36 10	5.9	5.16	6578,6580, 6584,6587, 6589,6591, 6801,6802, 6802,6808	00,*08*,17,16, 21,16,*24*,*10*, *23*,*08*,30,16, 08,02,*10*,*08*, *08*,*26*,07,*01*
2512	17.6	− 5 52	6.3	5.84	6589	07,*07*
1490	19.0	−57 39	6.8	5.89	6578,6580, 6584,6587, 6589,6591, 6801,6802, 6802,6808	16,10,02,07, 18,13,10,00, *23*,*12*,29,02, *23*,13,*17*,*12*, *19*,*05*,*16*,04
694	23.0	−73 5	5.1	5.29	6216,6578, 6580,6584, 6587,6589, 6591,6801, 6802,6808	04,20,*06*,*01*, *03*,*16*,*03*,03, *20*,*07*,*02*,*08*, 09,28,*09*,04, *06*,*07*,06,05
4462	26.0	−44 23	6.1	5.18	6216,6578, 6580,6584, 6587,6589, 6591,6801, 6802,6808	22,03,14,14, 11,25,06,02, 00,*08*,*03*,*17*, 09,17,*08*,*07*, *29*,*27*,*09*,*11*
2438	27.0	−19 14	5.6	5.33	6587	*06*,06
2661	50.6	− 7 36	6.3	6.14	6578,6580, 6587,6591	*07*,06,00,*17*, *12*,*08*,22,20
2090	52.7	+18 42	6.8	6.32	6578	*14*,13
1829	55.3	+32 39	6.3	5.96	6584	*05*,04
2029	8 56.9	+24 51	5.3	5.61	6584	*04*,04
3430	58.7	−51 48	5.9	5.36	6216,6578, 6580,6584 6587,6589, 6591,6801, 6802,6808	30,*02*,*30*,*07*, 02,*12*,*04*,*03*, 06,20,*06*,*05*, 28,09,00,*11*, *07*,*07*,07,*04*
6766	9 4.4	−26 22	6.5	6.21	6216,6578, 6580,6589, 6591	02,15,*07*,*24*, 01,*04*,16,*03*, 10,*03*
2765	4.5	−17 55	6.2	5.82	6216,6578, 6584,6589, 6591	16,14,*05*,00, *08*,06,*13*,*32*, 11,11
2139	7.0	+ 4 17	7.2	6.28	6216,6584, 6591	*01*,*06*,22,03, *03*,*17*
1893	7.3	+43 38	5.0	5.20	6578,6584, 6591	03,01,*14*,03, *02*,08
5206	7.4	−44 27	5.6	5.01	6216,6578, 6580,6584, 6587,6589, 6591,6801, 6802,6808	02,06,*16*,07, *24*,*24*,25,09, 07,20,08,*02*, 15,12,*08*,*13*, 17,*01*,*13*,*25*
5505	11.8	−37 0	5.1	4.56	6578,6580, 6584,6587, 6589,6591, 6801,6802, 6802,6808	11,04,*13*,03, 03,33,04,18, *05*,05,11,13, 09,*13*,*09*,*15*, *14*,*20*,*06*,*25*
2268	24.4	− 1 46	6.7	6.11	6216,6578, 6580,6587, 6589	11,05,06,13, *05*,*20*,*30*,13, 12,*05*
1277	26.2	−61 50	7.7	6.15	6946,6946, 6960 6961	12,18,10,25, *08*,*07*,*24*,*24*
1278	27.0	−61 55	7.2	6.58	6946,6946, 6960,6961	15,22,*03*,*26*, 03,04,*11*,*08*
1296	31.5	−62 1	9.2	8.53	6946,6960, 6961,7326	17,00,*14*,11, *04*,10,*33*,11
1302	32.9	−62 1	8.9	8.43	6946,6960, 6961,7326	12,04,07,03, *11*,*12*,*05*,05
2917	35.5	−13 53	5.8	5.18	6578,6580, 6584,6587, 6589	12,05,15,*12*, 11,*09*,*07*,*01*, *01*,*08*
1308	35.9	−62 6	7.3	7.45	6960,6961, 7326	*10*,05,*11*,*04*, 12,09
1477	36.6	−60 53	4.7	4.65	6216,6241, 6242,6243, 6578,6580, 6584,6587, 6589,6591	11,02,*01*,*04*, *19*,*15*,*05*,*05*, 08 *14*,*18*,04. *10*,*08*,15,*05*, 08,01,30,24
1313	36.6	−62 6	7.4	7.37	6960,6961	11,10,*14*,06
2042	36.7	+35 32	6.5	5.95	6216,6587 6589	10,*01*,05,*01*, *07*,*04*

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			DM.	Phot.		
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2041	9 37.8	+42 31	6.9	6.90	6587,6589,6591	22,06,*15*,*22*,01,08
6881	39.7	−27 19	5.1	4.79	6578,6580,6584,6587,6589,6591	06,*02*,*04*,*13*,02,*11*,02,09,*11*,*04*,14,17
2788	40.3	−53 26	6.0	5.64	6216,6241,6242,6243,6244,6578,6580,6584,6587,6589	06,*06*,07,*05*,*17*,*18*,29,*02*,*09*,*01*,*08*,*02*,12,*17*,13,07,01,06,09,*08*
5846	42.6	−44 18	5.7	5.65	6216,6241,6242,6243,6244,6578,6580,6584,6587,6589	09,*03*,*09*,*10*,*07*,*07*,11,01,08,*06*,05,*13*,*12*,02,*11*,14,11,16,05,*05*
2169	46.3	+24 52	5.8	5.30	6584,6587,6589	05,08,08,*08*,*12*,*03*
598	46.3	−76 19	7.4	5.39	6216,6241,6242,6243,6244,6247,6578,6584,6587,6589	12,06,10,17,*12*,*11*,21,14,07,*10*,00,*07*,*15*,*03*,07,02,*13*,*06*,*04*,*19*
2280	47.1	+ 2 55	6.0	6.00	6580,6584,6587	10,*19*,22,12,*06*,*16*
2418	51.3	−57 57	7.1	6.65	6960,6961,6965	00,*06*,11,30,*34*,*01*
1707	52.3	−58 16	7.9	7.61	6960,6961,6965	28,*11*,*12*,13,*20*,04
1709	52.5	−58 38	7.7	7.10	6960,6961 6965	*11*,20,*13*,*14*,12,07
2183	52.8	+12 55	5.5	5.40	6216,6578,6584,6591	00,*07*,*15*,*18*,04.19,14,03
1714	53.5	−58 20	8.5	9.04	7325,7326	00,*19*,*03*,23
6050	54.6	−35 25	5.6	5.27	6216,6241,6242,6243,6244,6246,6247,6578,6584,6587	17,*06*,11,02,*18*,*22*,*15*,04,10,*02*,26,09,09,*04*,*02*,*08*,02,*01*,*05*,*03*
1738	54.8	−58 36	8.8	8.67	7325,7326	12,*13*,*14*,15
1739	54.8	−58 23	8.4	7.93	6960	*05*,05
1750	55.5	−58 17	8.8	9.30	7325,7326	17,07,*06*,*19*
1781	57.1	−58 18	8.8	8.22	7325,7326	*17*,*07*,05,19
1695	58.8	−59 56	6.8	6.00	6961,6965,6977	*05*,*06*,16,16,*06*,*15*
1441	10 0.5	−61 24	6.8	6.06	6961,6965,6977	*15*,*04*,*09*,30,*02*,*03*
6156	3.7	−36 50	6.6	6.35	6977,6979,6981	06,*10*,13,*06*,*02*,00
1480	5.1	−61 16	8.8	8.05	6961,6965,6977	*02*,*09*,04,18,*04*,*08*
6194	10 5.2	−35 22	6.5	6.07	6977,6979,6981	15,14,*16*,*31*,12,06
1484	5.7	−61 23	8.6	8.65	6961,6965,6977	10,07,19,11,*19*,*28*
1701	6.2	−61 4	8.4	5.26	6979	04,*03*
6199	7.2	−37 4	8.2	8.62	6977,6979,6981	*10*,*02*,00,10,*06*,08
1967	7.5	−58 39	7.7	7.33	7325,7326	03,*13*,06,04
1984	8.5	−58 39	8.1	7.57	7325,7326	20,08,*10*,*18*
1985	8.6	−58 27	8.6	8.28	7325,7326	*07*,*18*,03,22
1742	8.6	−61 2	7.3	7.00	6961,6965,6977	*17*,12,00,20,*08*,*07*
6302	9.9	−38 36	6.9	6.51	6977,6979,6981	08,09,*03*,*09*,*07*,03
6303	9.9	−38 50	7.6	7.45	6977,6979,6981	*08*,*04*,06,15,02,*11*
1517	10.1	−61 9	6.8	6.31	6961,6965,6977	*10*,*04*,*12*,08,03,13
5713	10.5	−41 38	4.0	3.95	6216,6241,6242,6243,6244,6246,6247,6249,6250,6578	10,11,20,07,*13*,*09*,*07*,03,00,*09*,*04*,*13*,15,13,*13*,01,13,*22*,00,*02*
6326	11.4	−38 47	8.0	8.18	6977,6979,6981	*10*,07,05,*18*,08,06
2031	11.9	−58 14	8.9	9.00	7325,7326	03,*06*,06,*05*
6254	12.0	−36 24	7.5	7.52	6977,6979,6981	*04*,*01*,*09*,*02*,11,03
2352	15.9	+ 2 47	6.5	6.66	6216,6243,6249,6946	*04*,29,04,03,05,*02*,*35*,03
2192	16.5	+15 29	6.3	6.15	6241,6249,6250,6580	01,*11*,00,09,13,10,*12*,*06*
2911	18.4	− 3 35	6.3	6.07	6216,6241,6247,6249,6250	*02*,*03*,*11*,*07*,12,*08*,01,01,10,05
6509	19.1	−37 31	5.7	5.36	6241,6242,6243,6244,6246,6247,6249,6250,6584,6587,6946	*11*,*05*,*04*,*25*,*08*,*02*,14,*01*,21,04,09,*06*,*06*,07,*05*,*09*,22,04,*06*,*04*,*05*,26
2128	20.2	+34 18	4.5	4.67	6242,6249,6250,6578,6946	06,*23*,04,*07*,*08*,*10*,06,15,*03*,20
2123	21.6	+42 6	7.0	6.06	6216,6243,6249	11,05,*01*,*14*,09,*07*
1310	25.8	−64 40	8.6	6.54	6578	16,*17*
3181	26.1	−13 5	6.0	5.61	6216,6241,6242,6243,6247,6580,	*01*,02,03,00,03,00,*04*,01,06,07,*02*,*07*,

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			DM.	Phot.						DM.	Phot.		
	h. m.	° ′						h. m.	° ′				
					6961	*09*,*01*	*6343*	11 2.7	−42 6	5.5	5.21	6216,6241,	12,04,15,*05*,
8084	10 26.2	−25 59	6.6	6.46	6216,6241,	07,11,*07*,04,						6242,6243,	*05*,*13*,*08*,05,
					6242,6243,	08,*04*,01,*04*,						6244,6246,	06,*08*,01,*03*,
					6244,6946,	14,*02*,22,*16*,						6247,6249,	*05*,*10*,06,12,
					6960	*24*,*11*						6250,6257	*02*,01,09,*06*
3909	27.5	−53 13	6.4	4.92	6216,6241,	*13*,03,*02*,*05*,	2344	3.5	+25 12	6.0	5.74	6242,6243,	*04*,*13*,*05*,02,
					6242,6243,	*18*,*12*,03,04,						6246,6960	05,*03*,03,12
					6244,6246,	00,*03*,*01*,*01*,	3321	7.5	−17 57	5.8	6.10	6241,6242,	03,*02*,*01*,*16*,
					6247,6249,	03,05,13,03,						6243,6244,	*03*,*03*,*04*,*01*,
					6250,6257	02,*10*,14,09						6246,6965,	19,08,*06*,13,
1927	37.6	+26 51	5.3	5.51	6241,6242,	*03*,*07*,*02*,*14*,						6977,6979,	*10*,09,06,*07*,
					6244,6961,	00,05,*15*,00,						6981,7325	05,25,*13*,*14*
					6981,7326	08,16,07,07	1657	19.1	−64 24	5.5	5.22	6216,6241,	11,01,*09*,*01*,
2283	44.0	+11 4	5.3	5.35	6242,6243,	*19*,*29*,*04*,08,						6242,6243,	00,*10*,10,14,
					6246,6960,	13,14,15,*11*,						6244,6246,	*10*,*03*,05,01,
					6961,6981,	*03*,*03*,04,27,						6247,6249,	*09*,02,*04*,11,
					7326	02,*09*						6250,6257	03,*08*,04,*01*
2058	48.2	+43 43	5.2	4.70	6216,6242,	02,01,05,*09*,	2521	29.3	+ 3 37	6.2	5.75	6241,6242,	*04*,*09*,*11*,*20*,
					6244,6960,	*11*,*18*,06,17,						6243,6965,	18,*11*,13,26,
					6961,6981,	07,09,10,14,						6977,6979	10,*05*,*15*,04
					7325,7326	*04*,*09*,00,*19*	2374	29.5	+17 21	5.7	6.01	6241,6244,	03,*02*,*04*,09,
3947	48.4	−56 43	6.3	5.28	6216,6241,	03,06,*11*,05,						6246,6965,	19,04,*24*,03,
					6242,6243,	*02*,*13*,*05*,*06*,						6977,6979	*06*,*07*,*09*,12
					6244,6246,	03,02,*06*,*11*,	2110	33.0	+44 10	6.0	5.47	6216,6246,	22,12,03,*05*,
					6247,6249,	*06*,*04*,00,20,						6247,6977,	*06*,*05*,*16*,01,
					6250,6257	05,01,13,12						6979	*08*,04
2400	55.2	+39 45	4.9	4.98	6241,6243,	*04*,*15*,*17*,*21*,	744	33.1	−75 21	6.7	5.66	6216,6241,	17,13,*07*,*20*,
					6244,6981,	01,05,26,34,						6242,6243,	*10*,*20*,*20*,*04*,
					7326	*23*,16						6244,6246,	03,*16*,06,*03*,
2471	56.8	− 1 57	5.2	4.59	6216,6242,	04,*20*,*19*,*25*,						6247,6249,	13,14,15,23,
					6243,6244,	*06*,*19*,*05*,00,						6250,6257	16,*05*,00,*05*
					6246,6247,	09,08,*13*,*13*,	7610	35.2	−34 11	4.9	4.74	6216,6241,	04,01,01,*01*,
					6250,6257,	02,04,00,00,						6242,6243,	*21*,*17*,*06*,*18*,
					6960,6981	29,17,25,14						6244,6246,	*12*,*05*,00,12,
6954	11 0.2	−35 16	5.8	5.45	6241,6242,	17,*08*,*14*,*19*,						6247,6249,	08,00,13,06,
					6243,6244,	*08*,03,*06*,*04*,						6250,6257,	*05*,*02*,*03*,01,
					6246,6247,	13,14,*03*,07,						6965,6977,	01,15,*12*,15,
					6249,6250,	04,04,12,*03*,						6979,7326	09,04,03,*03*
					6257,6589,	20,03,*19*,*25*,	*2375*	37.0	+22 46	6.5	6.67	6242,6246,	23,05,*07*,*01*,
					6960,6961,	06,11, R, 02,						6247,6965	*06*,06,*15*,*02*
					6965,6981,	08,08,09,10,	3399	37.7	− 2 59	7.2	7.54	6243 6244,	04,17,05,*05*,
					7325,7326	*20*,*24*,04,04						6246,6247,	08,14,*01*,00,
8342	1.1	−26 45	6.4	5.76	6241,6243,	*03*,07,*01*,*09*,						6249,6257,	02,*01*,14,04,
					6244,6246,	*14*,*02*,24,05,						6977,6979	*11*,*23*,*11*,*20*
					6247,6960,	19,05,27,13,	3388	38.5	−14 29	7.0	6.98	6216,6246,	11,14,00,08,
					6961,6965,	*18*,*17*,*15*,*07*,						6247,6249,	*09*,*02*,11,05,
					6981,7325,	*07*,*04*,06,04,						6250,6977,	24,21,*30*,*23*,
					7326	01,*23*						6979	*19*,*17*
2387	1.8	+ 2 30	6.0	5.49	6242,6243,	*17*,01,*03*,*17*,	*7564*	40.8	−45 8	5.9	5.36	6216,6241,	09,13,*01*,02,
					6244,6965	*18*,*12*,31,33						6242,6243,	*11*,*26*,*01*,*03*,

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			DM.	Phot.		
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					6244,6246,	*07*,*10*,*07*,*01*,
					6247,6249,	*01*,*07*,08,21,
					6250,6257	02,04,14,01
2264	11 46.0	+33 56	6.2	6.24	6216,6247,	05,*04*,08,*15*,
					6249,6257,	*08*,*07*,21,23,
					6946,6960,	05,08,*11*,*21*
					6977,6979	09,02,*02*,*06*
8930	49.7	−25 9	5.8	5.30	6216,6246,	*10*,*03*,02,*04*,
					6247,6249,	*04*,*06*,01,*07*,
					6250,6257,	*04*,11,*09*,*10*,
					6960	27,20
4751	53.2	−55 45	6.4	5.55	6216,6241,	*02*,*01*,05,*05*,
					6242,6243,	*12*,*11*,05,02,
					6244,6246,	*03*,*05*,08,04,
					6247,6249,	05,*14*,19,05,
					6250,6257	08,*02*,02,*05*
3484	12 8.2	− 2 49	9.3	9.98	6278	*11*,10
2436	10.9	+15 28	5.1	5.16	6246,6247,	00,02,05,*05*,
					6249,6960,	09,*06*,*15*,*13*,
					6961	09,12
2219	13.5	+33 18	7.2	6.65	6241,6247,	*16*,02,09,02,
					6250	03,00
2920	13.6	− 0 14	6.3	5.98	6241,6244,	*01*,03,04,*02*,
					6247,6249,	*04*,04,09,*03*,
					6250,6946,	05,*02*,*06*,08,
					6960	*08*,*02*
2218	18.9	+43 5	6.3	5.92	6246,6247,	12,*08*,*04*,02,
					6250	04,*04*
8146	20.1	−34 38	5.8	5.77	6216,6241,	02,02,07,04,
					6242,6243,	*11*,*19*,02,09,
					6244,6246,	*09*,*10*,04,*10*,
					6247,6249,	10,03,17,09,
					6250,6257,	*17*,*08*,07,05,
					6946,6961	24,18,*24*,21
5063	21.9	−55 11	7.4	6.96	6946,6961,	33,*01*,01,*32*
5084	23.2	−55 50	7.2	6.11	6216,6241,	09,03,12,*06*,
					6242,6243,	*26*,*34*,01,10,
					6244,6246,	*11*,*22*,08,*03*,
					6247,6249,	*02*,*01*,04,02,
					6250,6257,	*10*,02,*02*,*02*,
					6946,6960,	28,24,21,08,
					6961	01,08
5231	26.3	−54 48	8.8	8.48	6946,6960,	*59*,*49*,45,43,
					6961	05,17
1336	26.5	−71 35	4.9	3.92	6216,6241,	01,*07*,*13*,*02*,
					6242,6243,	*07*,*08*,06,*06*,
					6244,6246,	05,*13*,08,*16*,
					6247,6249,	12,12,12,14,
					6250,6257	*08*,*06*,02,09
5120	26.6	−55 34	8.2	6.71	6946,6960,	25,13,*11*,*07*,
					6961	05,*25*
3489	12 26.9	−15 38	5.0	4.34	6241,6246,	*06*,*03*,07,*04*,
					6247,6249,	*07*,*07*,*07*,05,
					6250,6278,	02,03,*07*,*04*,
					6946,6961	*06*,16,03,12
5241	27.8	−54 25	7.5	7.39	6946,6960,	06 21,*08*,*14*,
					6961	*08*,02
2523	28.6	+24 50	6.3	6.28	6241,6249,	03,*03*,13,*01*,
					6250	01,*11*
3372	28.6	− 8 54	5.3	5.54	6241,6244,	*04*,*08*,16,*06*,
					6247,6250,	12,*01*,*06*,*01*,
					6257,6278,	07,01,09,*03*,
					6961	*02*,*16*
7745	32.3	−47 59	4.4	3.97	6216,6241,	07,*01*,*13*,*10*,
					6242,6243,	01,*23*,02,*21*,
					6244,6246,	*02*,00,09,*03*,
					6247,6249,	02,*03*,18,04,
					6250,6257,	04,13,10,12
9233	32.4	−26 35	5.6	5.48	6241,6243,	03,04,00,01,
					6246,6250,	*07*,*02*,05,*08*,
					6257,6278,	11,02,*11*,*15*,
					7006	12,05
2898	36.9	−62 30	6.6	5.97	6216,6241,	*06*,05,05,08,
					6242,6243,	*06*,*08*,08,*06*,
					6244,6246,	00,*11*,*01*,*03*,
					6247,6249,	09,*05*,16,*05*,
					6250,6257	11,*06*,*01*,*04*
2639	40.6	+ 8 13	6.0	5.21	6244,6250,	02,*05*,00,*06*,
					6257	09,01
2549	43.9	+14 41	5.9	5.78	6241,6250,	06,12,*12*,*17*,
					6257	05,03
3563	48.1	−10 23	8.7	8.90	6278	03,*04*
3581	51.7	−10 21	8.5	8.80	6278	*03*,04
2234	52.1	+44 6	6.5	6.83	6242,6249,	03,*05*,10,*02*,
					6250	*06*,00
3384	54.5	− 3 16	6.2	5.89	6241,6242,	10,14,*17*,*14*,
					6244,6247,	*01*,*06*,03,*03*,
					6249,6250,	*02*,06,14,*03*,
					6278,7006	04,*09*,02,05
2530	58.1	+23 10	6.7	6.86	6244,6247,	19,03,01,03,
					6250,7006	13,*05*,*10*,*20*
8088	13 0.4	−47 56	5.3	4.84	6241,6242,	02,*09*,*12*,*17*,
					6243,6244,	12,02,*05*,*01*,
					6246,6247,	10,12,07,*10*,
					6249,6250,	05,*06*,12,01,
					6257,6278,	10,02,*12*,*10*,
8441	1.4	−35 19	6.0	5.73	6241,6242,	*06*,*04*,*10*,*06*,
					6243,6244,	08,06,*02*,*16*,
					6246,6247,	00,*05*,08,*13*,
					6249,6250,	21,*08*,10,*03*,

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			DM.	Phot.		
	h. m.	° ′				
					6257,6278,7006	10,24,03,*13*,*18*,05
6194	13 1.7	−52 55	6.6	5.80	6241,6242,6243,6244,6246,6247,6249,6250,6257,6278	04,03,*03*,*13*,00,*19*,12,*03*,13,*01*,*11*,*09*,02,*11*,00,07,00,10,03,*04*
3515	3.6	−22 35	5.0	4.88	6241,6243,6244,6246,6249,6257,6278,7006	*02*,04,05,07,*08*,*15*,*01*,*04*,11,06,04,08,01,*11*,12,*12*
3608	4.4	−15 59	6.8	6.80	6241,6242,6243,6244,6247,6278,7006	08,05,*01*,*06*,11,*01*,07,*01*,01,*08*,13,*13*,*19*,02
2435	14.5	+35 39	6.7	5.88	6242,6243,6244	06,03,01,*17*,01,08
384	24.7	−85 16	6.2	5.58	6241,6242,6243,6244,6246,6247,6249,6250,6257,6278	06,*08*,05,*11*,*10*,*11*,*08*,00,*05*,05,01,04,11,06,*10*,16,12,01,00,*01*
2462	28.3	+35 25	6.7	6.82	6242,6243,6244	13,28,*12*,*14*,*11*,*06*
9189	31.1	−33 58	6.7	6.50	7003,7006,7017	06,03,09,*05*,03,*19*
9233	34.7	−33 51	7.6	7.34	7003,7006,7017	24,05,*24*,*07*,*04*,06
9242	35.3	−33 57	7.3	7.04	7003,7006,7017	17,03,*01*,*07*,*10*,00
9245	35.4	−33 9	8.4	9.37	7003,7006,7017	05,07,*05*,11,*05*,*13*
5725	35.4	−54 3	6.1	5.15	6241,6242,6243,6244,6246,6247,6249,6250,6257,6278	01,01,*03*,*27*,16,20,*05*,10,*07*,*08*,*05*,*06*,07,*09*,04,*05*,07,10,10,*12*
9252	36.0	−33 16	8.8	9.02	7003,7006,7017	07,06,*03*,33,*32*,*12*
9259	36.6	−33 29	7.3	6.69	7003	*17*,17
9566	37.1	−32 10	7.5	8.27	7003,7006,7017	*06*,*16*,12,*03*,08,04
3540	38.7	− 5 0	7.0	6.60	6242,6243,6244,6246,6249,6257,7006	*11*,*04*,*19*,*06*,05,*16*,*08*,*04*,18,03,39,35,*19*,*15*
9972	40.0	−25 37	6.1	5.89	6242,6243,6246,6247,6249,6278	*12*,10,*04*,09,*08*,*10*,*07*,*10*,10,*02*,17,06
3735	40.2	−15 16	6.7	6.23	6242,6243,6244,6246,6249,6278	*05*,03,05,*06*,00,*13*,03,*05*,04,05,01,*05*
8995	13 41.1	−35 45	5.8	5.23	6241,6242,6243,6244,6246,6247,6249,6250,6257,6278	02,*14*,*18*,*21*,18,07,05,*12*,11,*02*,05,02,*12*,*11*,*01*,07,12,15,02,06
2424	42.0	+41 36	5.7	5.82	6242,6243,6244	18,08,02,*08*,*12*,*08*
8909	45.6	−46 25	6.2	5.88	6241,6242,6243,6244,6246,6247,6249,6250,6257,6278	09,*08*,06,*02*,*05*,*05*,*14*,*04*,*02*,*06*,*10*,*07*,02,*13*,17,*11*,31,22,04,*03*
2635	47.4	+12 40	6.8	6.14	6243,6247,6249	17,*16*,00,*09*,13,*07*
9090	47.7	−35 11	6.0	5.62	7003,7006,7017	08,02,08,02,*07*,*13*
9223	48.1	−34 50	6.7	6.21	7003,7006,7017	*08*,14,*22*,*07*,08,14
2650	53.9	+22 11	5.5	5.87	6244,6247,6250,7006,7388	15,*07*,03,*19*,04,17,*05*,*02*,*08*,04
2761	56.6	+ 2 2	4.2	4.27	6243,6244,6249,7388	01,*14*,01,*10*,08,02,04,05
5395	59.3	−59 14	7.1	6.48	7018,7019,7020	14,*06*,*01*,*17*,17,*05*
5383	14 1.8	−58 48	7.0	6.34	7018,7019,7020	07,11,*09*,*04*,03,*06*
5403	4.8	−58 49	8.8	9.16	7019,7020	*18*,*11*,08,20
5411	5.7	−58 55	8.2	8.06	7018,7019,7020	*01*,*04*,*02*,*08*,28,*10*
5420	6.6	−58 54	8.0	8.10	7018,7019,7020	22,11,*03*,*23*,*02*,*03*
2490	8.7	−66 7	5.7	5.88	5946,6241,6242,6243,6244,6246,6247,6249,6250,6257	01,09,*02*,05,09,*09*,10,*02*,*25*,*15*,*04*,02,05,*06*,*05*,*13*,26,*01*,10,03
755	10.3	−79 39	5.2	5.12	5946,6241,6242,6243,6244,6246,6247,6249,6250,6257	*09*,*02*,09,02,00,*08*,07,06,*08*,*14*,14,17,*01*,*13*,06,01,*09*,*01*,12,*05*
5464	11.7	−58 13	7.6	7.24	7018,7019,7020	*15*,*13*,*10*,*02*,28,13
5465	11.8	−58 30	8.0	7.86	7018,7019,7020	16,12,*06*,*04*,*15*,*01*
5294	12.5	−60 48	6.3	53.4	7018,7019,7020	12,03,*07*,00,*08*,*03*

DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.
			DM.	Phot.		
	h. m.	° ′				
5984	14 13.3	−55 56	4.7	4.39	5946,6241, 6242,6243, 6244,6246, 6247,6249, 6250,6257	*18*,*09*,10,*03*, 03,*23*,*01*,*01*, *03*,*14*,12,28, 05,*19*,10,18, 03,*12*,10,08
2782	14.4	+13 28	5.7	5.47	6242,6247, 6257,7017	09,17,*04*,*15*, *04*,*10*,03,01
6619	15.5	−58 0	6.5	5.06	7018,7019, 7020	02,*08*,22,*16*, *02*,01
2750	15.7	+39 15	6.0	6.33	6246,6257, 6278,7017	07,*14*,*01*,10, *03*,*13*,16,*03*,
9570	16.3	−34 20	6.0	5.64	6241,6242, 6243,6244, 6246,6247, 6249,6250, 6257,6278, 7017	14,08,*08*,*01*, 11,12,*21*,*19*, 10,09,*11*,*04*, *03*,*04*,06,*07*, 04,*03*,10,01, 6,0
3862	18.5	−15 39	6.7	6.79	6242,6243, 6247,6257, 6278	05,*10*,*08*,*09*, *01*,03,17,02, 05,*01*
11469	19.1	−24 21	5.7	5.25	6242,6243, 6247,6257, 6278,7017	*07*,*02*,*01*,01, 01,*04*,*02*,*01*, 13,08,02,*04*,
2875	19.3	+ 6 16	5.5	5.22	6246,6257, 6278,7017	07,*09*,*01*,*03*, *12*,*04*,12,14
3880	22.1	− 5 40	6.5	6.26	6242,6243, 6247,6257, 6278,7018	*14*,*18*,*08*,02, 11,*10*,10,06, *01*,*06*,17,10
9383	23.7	−44 53	5.8	5.58	5946,6242, 6243,6244, 6246,6247, 6249,6250, 6257,6278	09,*11*,13,*07*, 06,06,*11*,*21*, 05,06,01,03, 01,*10*,*07*,00, 17,*03*,05,07
2365	27.5	+43 49	6.8	6.76	6246,6257, 6278	07,06,04,*18*, *04*,04
2388	27.9	+27 8	6.2	6.11	5945,6249, 6257,7018	R,*10*,15,*01* *04*,*06*,*11*,16
9366	36.2	−45 10	8.4	8.24	7387,7388, 7389	13,09,*03*,*12*, *01*,*04*
11634	37.2	−25 5	8.8	9.14	6317	*01*,01
9580	38.6	−45 0	9.6	9.44	7387,7388, 7389	15,08,*07*,07, 02,*25*
9393	38.8	−45 14	9.2	9.30	7387,7388, 7389	12,20,*15*,*16*, 04,*05*
9398	39.2	−45 27	8.6	8.78	7387,7388, 7389	09,07,*11*,*02*, 00,00
11667	41.1	−25 2	8.7	9.04	6309,6317,	*10*,08,13,*09*,
9419	41.2	−45 44	8.0	8.15	7387,7388, 7389	04,01,*05*,01, *05*,03
9435	42.6	−45 27	8.8	9.26	7387,7388, 7389	*03*,10,*03*,00, *18*,13
9436	14 42.6	−45 22	9.2	9.44	7387,7388, 7389	12,07,*04*,13, *13*,*16*
10555	43.8	−25 7	9.0	9.75	6317	*01*,01
9665	45.4	−45 2	9.4	9.52	7387,7388, 7389	00,03,01,*04*, *06*,04
9638	45.7	−46 13	9.3	9.04	7003,7017, 7018	*01*,16,*08*,*20*, 05,07
9639	45.7	−46 21	7.2	7.16	7003,7017, 7018	*20*,*08*,*03*,*20*, 33,15
9484	46.0	−45 10	9.0	9.50	7387,7388, 7389	*03*,*01*,*03*,02, *08*,10
9649	46.4	−46 13	8.4	8.28	7003,7017, 7018	02,*08*,*09*,*24*, 20,19
11721	46.9	−25 2	7.9	8.01	6309	*02*,02
9496	47.3	−45 51	9.2	8.67	7003,7017, 7018	28,15,*27*,*09*, *02*,*05*
9672	48.6	−46 13	7.5	7.58	7003,7017, 7018	10,11,*20*,*21*, 14,08
7634	49.2	−52 24	5.9	5.50	5946,6242, 6243,6244, 6246,6247, 6249,6257, 6278,6309	*02*,*14*,*05*,*12*, 18,00,*07*,*05*, 05,*03*,04,04, 08,05,*11*,*02*, *15*,*06*,09,23
9727	50.2	−44 14	9.1	8.68	6309	15,*15*
2796	51.5	+14 51	6.2	5.94	5945,5946, 6278,7017, 7019	*01*,*09*,00,07, 05,07,04,*10*, 03,08
3696	52.0	− 3 56	4.8	4.60	5941,5945, 6249,6278, 6309,7017, 7019	14,*01*,*03*,00, *04*,*03*,*03*,*06*, *05*,*10*,18,08, *03*,*04*
10183	56.2	−27 40	6.2	5.90	5941,5946, 6249,6278, 6309,7003, 7019	05,*19*,*11*,*05*, 05,*09*,06,01, 11,06,*10*,*02*, 05,11
10560	56.8	−32 15	5.8	5.53	5941,5946, 6242,6243, 6244,6246, 6247,6249, 6257,6278, 7003,7019	*19*,01,14,*01*, *05*,*04*,*10*,16, *09*,*05*,*05*,06, 02,00,16,*25*, 09,*03*,*03*,*06*, *01*,26,01,*05*
2905	57.9	+ 2 28	4.7	4.43	5945,6249, 6278,7017, 7389	*11*,*11*,07,*04*, *09*,*08*,10,14, 17,*03*
2840	58.2	+40 47	3.0	3.45	5945,6257, 6278,7003, 7389	02,10,01,*13*, 04,*17*,06,*04*, 05,04
9889	15 2.1	−44 54	4.8	4.17	5941,5945, 5946,6244,	*01*,*10*,*11*,*03*, *07*,*01*,*01*,*16*,

DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.	DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.
			DM.	Phot.						DM.	Phot.		
	h. m.	° ′						h. m.	° ′				
					6246,6247,	*02,11,16,01*,						7018,7020,	08,*03,20,04*,
					6249,6257,	03,*01*,13,13,						7030,7033,	*07*,03,00,01,
					6278,6309,	07,*02*,24,15						7387	01,05
2873	15 2.9	+25 16	4.8	4.99	5946,6249,	*15,11*,04,*05*,	10251	15 43.2	−45 6	6.4	6.15	5941,5945,	*04,07,01,03*,
					6278,7003,	*04,15*,04,06,						5946,5961,	02,*03,01,09*,
					7020,7387,	*12,11*,08,10,						5970,6247,	09,*01*,12,08,
					7388,7389	15,27,03,00						6249,6257,	*05,13*,02,02,
4047	6.5	−19 25	4.5	4.64	5941,5945,	*02,12*,10,*06*,						6278,6309	10,07,05,*03*
					5946,6249,	08,*06*,00,*02*,	6711	43.3	−54 45	6.7	5.86	5941,5945,	04,02,05,*14*,
					6278,7003,	*03,06*,08,09,						5946,5961,	12,*05,03,10*,
					7020	05,04						5970,6247,	*04*,00,*03,08*,
3020	9.4	−66 6	8.4	8.62	7018,7019,	*15*,04,03,01,						6249,6257,	*03*,01,11,14,
					7020	24,*16*						6278,6309	12,*01,05,01*
2561	11.5	+33 41	3.0	3.51	5945,5946,	04,*12,22,12*,	3829	43.7	− 3 31	6.0	5.64	5941,5945,	12,*08,11,06*,
					6278,7003,	*11,09*,06,*02*,						6257,6278,	10,08,18,04,
					7018,7020,	21,00,10,02,						6309,6317,	*08,05,04,03*,
					7388,7389	13,08,13,*11*						7018,7019,	06,10,*01,17*,
2836	11.5	−67 7	6.6	6.34	7018,7019,	24,03,*01,02*,						7020,7033,	03,08,*23,06*,
					7020	00,*26*						7387	15,*09*
2764	13.4	−66 15	8.5	7.91	7018,7019	02,00,*04*,02	11131	45.0	−25 27	5.3	4.72	5941,5945,	*11,07*,04,03,
3038	13.6	−65 51	7.7	7.12	7018,7019	12,17,*27,03*						5946,6278,	05,*03*,02,*11*,
3059	18.4	−65 47	6.9	7.02	7018,7019,	08,10,*03,40*,						6309,6317,	*12,06,02,02*,
					7020	26,*04*						7019,7020,	01,05,14,31,
1625	29.2	−73 7	6.0	5.74	5941,5945,	03,*14*,03,15,						7033,7387	13,*12*,06,*28*
					5946,6244,	09,*07,12,05*,	2922	47.5	+15 21	9.0	9.68	5961,5963,	04,*22*,04,16,
					6246,6247,	*02*,18,*05,12*,						6309	*17*,14
					6249,6257,	03,*19*,18,09,	2648	49.2	+42 44	4.3	4.66	5945,5946,	*09,12*,04,*10*,
					6278,6309	*03,09*,11,*02*						6309,7019,	*20,19*,12,16
2982	37.1	+13 10	5.5	5.43	5941,5945,	02,*07,01*,00,						7030,7033,	*07,05,06,02*,
					5946,7003,	*03,10,08,13*,						7388,7389	33,20,01,10
					7018,7019,	*04*,15,09,*04*,	4197	50.6	−18 19	9.2	9.82	5961,5963,	*14,04*,23,18,
					7020,7387,	14,09,21,*03*,						6309	*22*,00
					7389	04,*15*	2738	57.4	+30 7	5.0	5.04	6278,6309,	*05*,16,*06,21*,
4171	38.4	−15 21	5.8	5.47	5941,5945,	*01,09*,09,*18*,						6317,7030,	02,*11,04*,05,
					6249,6278,	08,03,22,12,						7389	19,01
					6309,7003,	11,10,12,*02*,	2886	57.9	+23 4	4.6	4.94	5946,6278,	*09,04*,06,09,
					7018,7020	01,*09,31,12*						6309,7030,	*05,10*,04,12
3139	38.7	−65 8	6.3	5.64	5941,5945,	06,*02*,05,01,	2376	16 5.6	+45 12	3.8	4.20	5961,6278,	04,*11*,17,13,
					5946,5961,	03,*07,10,09*,						6309	*14,09*
					6246,6247,	*04*,06,02,01,	4383	10.2	−14 36	6.3	6.18	5941,5945,	*02,08,03,02*,
					6249,6257,	00,*07*,00,*02*,						5946,5961,	08,01,01,*05*,
					6278,6309	*04*,04,03,06						5970,6317,	*01*,06,04,*02*,
3072	40.4	+ 5 45	6.7	5.69	5941,6278,	*11,11*,07,08,						7387	13,*11*
					6309,7387,	07,*10*,14,11,	2803	12.7	+29 23	5.7	5.79	5946,5974,	02,01,05,08,
					7388,7389	*08,02*,04,*08*						6309	*06,12*
10524	40.4	−34 22	5.8	5.69	5941,5945,	01,02,*15,05*,	10778	17.9	−37 20	5.8	5.52	5941,5945,	*01,14*,01,*02*,
					5946,6244,	08,*07,05*,01,						5946,5961,	13,*21,04,12*,
					6246,6247,	04,01,07,*03*,						5963,5970,	20,00,14,*01*,
					6249,6257,	*01,01*,17,03,						5973,5974,	*17,02,02,02*,
					6278,6309,	*07,09*,14,*02*,						5982,6278	05,*07*,18,22

DM. No.	R. A. 1900.	Dec. 1900.	Magn. DM.	Magn. Phot.	Julian Days.	Residuals.	DM. No.	R. A. 1900.	Dec. 1900.	Magn. DM.	Magn. Phot.	Julian Days.	Residuals.
	h. m.	° ′						h. m.	° ′				
					6068,6071	12,13,12,18						6072,6079,	05,00,17,15,
13471	23 1.5	−51 14	6.2	5.97	6008,6009,	05,*14*,01,*20*,						7466	*09*,*23*
					6010,6015,	00,*23*,04,*02*,	5114	23 29.7	+39 41	6.0	5.53	6038,7466	02,*02*, R, R
					6019,6022,	*09*,12,04,*08*,	4508	32.7	+43 52	6.3	5.70	6038,6068,	07,*02*,01,00,
					6027,6030,	06,01,10,06,						6738,7466	*01*,*04*, R, R
					6038,6039	*02*,*07*,25,15	4952	32.9	+17 51	5.8	5.54	6038,6738	04,*09*,07,00
5278	2.6	+20 37	6.2	5.95	6027,6038,	05,03,*13*,*04*,	5183	36.9	+ 6 42	6.5	5.94	6738	05,*05*
					6071,6072,	11,04,*17*,*10*,	15239	40.7	−40 45	6.1	6.42	6019,6022,	*11*,*19*,04,*13*,
					7466	R, R						6027,6030,	*02*,*10*,01,*14*,
3964	8.0	+48 51	5.0	4.58	6019,6068,	*13*,*12*,13,06,						6038,6039,	*20*,*07*,15,17,
					6071,7466	06,02, R, R						6068,6071,	01,*12*,06,*06*,
5852	10.4	− 4 3	5.3	5.67	6019,6022,	*05*,*17*,*05*,*14*,						6072,6079	21,07,18,18
					6027,6068,	*06*,03,04,13,	14047	41.9	−50 47	5.2	5.32	6019,6022,	*02*,*18*,21,09,
					6071	12,12						6027,6030,	*03*,*01*,*03*,*06*,
6406	17.4	−15 35	5.3	5.26	6027,6038,	*11*,*06*,*02*,*07*,						6038,6039,	14,*08*,02,*05*,
					6068,6071,	*02*,07,08,10,						6068,6071,	*10*,*14*,*03*,07,
					6072	*03*,04						6072,6079	12,02,*01*,03
4891	23.3	−63 40	4.5	5.82	6015,6019,	01,*11*,05,*04*,	18353	43.7	−28 41	4.6	4.67	6019,6038,	*08*,*14*,*03*,*11*,
					6022,6027,	03,*07*,04,*03*,						6072,6079,	12,09,12,07,
					6030,6038,	05,03,*13*,*02*,						6738	09,*12*
					6039,6068,	21,13,*04*,*08*,	4649	44.6	+28 17	6.2	5.85	6038	*04*,04
					6071,6072	05,00,*06*,01	6522	46.2	−19 28	5.0	5.26	6027,6038,	06,*02*,*15*,*08*,
1473	26.9	−77 57	6.4	5.79	6019,6022,	*02*,*12*,11,*20*,						6072,6079,	20,20,04,*07*,
					6027,6030,	04,03,14,11,						6738	*14*,*07*
					6038,6039,	*15*,*11*,12,00,	907	52.1	−82 44	6.7	5.76	6731	*04*,04
					6068,6071,	15,17,00,*02*,	5749	56.7	− 3 35	5.3	5.21	6027,6038,	*04*,*07*,00,*11*,
					6072,6079	10,*03*,05,*09*						6068,6079,	03,06,07,07,
15527	27.6	−38 22	4.8	4.48	6019,6022,	*05*,*09*,*05*,*20*,						6734	*10*,08
					6027,6030,	*04*,*04*,09,*09*,	2346	59.5	−73 28	7.6	7.43	6731,6736,	08,*07*,*15*,*02*,
					6038,6039,	*05*,00,22,21,						6737	13,02
					6068,6071,	*07*,*10*,14,00,							

REMARKS.

h. m.

0 5.5. In H. A. **50**, 225, H. R. 30, for 22, read 20.

0 22.3. Observed too late to be included in H. A. **50**. Not included in H. A. **54**, since it was brighter than magn. 6.50.

0 29.2. J. D. 6072. Residual *75*, rejected for discordance.

3 43.4. In H. A. **50**, 226, insert 1181, 10, 5.20, 16.

4 57.0. See 0^h 22^m.3.

6 47.2. J. D. 6808. Second reading of first set in wrong quadrant. Rejected.

7 2.6. In H. A. **50**, 226, insert 2684, 4, 5.22, *36*.

7 36.3. In H. A. **50**, 226, for 2965, read 2966.

8 52.7. See 0^h 22^m.3.

9 26.2. In H. A. **50**, 226, H. R. 3776, for 6, 6.10, 09, read 8, 6.15, 14.

10 25.8. A. G. C. 14343, magn. 7.2. Spectrum Class K. The difference in magnitude is perhaps due to the color.

11 0.2. J. D. 6961. Third and fourth readings of first set in wrong quadrant. Rejected. In H. A. **50**, 226, H. R. 4313, for 32, 5.47, *06*, read 31, 5.45. *08*.

12 26.3. No apparent reason has been found for the discordance of these observations. In H. A. **54**, 139, for 5, read 6.

14 27.9. J. D. 5945. First reading of first set in wrong quadrant. Rejected.

15 37.1. In H. A. **50**, 227, H. R. 5843, for 22, read 18.

15 49.2. In H. A. **50**, 227, H. R. 5914, for 20, read 16.

23 2.6. J. D. 7466. Observations rejected, since the coefficient of northern absorption is uncertain. In H. A. **50**, 227, H. R. 8799, for 12, 6.10, 17, read 8, 5.95, 02.

23 8.0. See 23^h 2^m.6. In H. A. **50**, 227, H. R. 8830, for 8, read 6.

23 29.7. See 23^h 2^m.6. In H. A. **50**, 227, H. R. 8947, for 4, read 2.

23 32.7. See 23^h 2^m.6. In H. A. **50**, 227, H. R. 8962, for 8, read 6.

DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.
			DM.	Phot.		
	h. m.	° ′				
5827	21 42.4	− 6 23	6.2	6.13	6009,6010, 6015,6019, 6038	08,*04*,*03*,*21*, 01,*04*,06,04, 05,07
13934	42.6	−47 21	8.4	8.81	7110,7111 7112	24,*05*,01,*07*, 09,*20*
13941	43.3	−47 4	7.0	7.09	7110,7111, 7112	10,08,*24*,*20*, 27,01
4635	48.5	+25 27	5.5	5.12	6010,6019, 6030	04,*09*,06,00, *09*,05
9733	51.1	−55 28	4.3	4.38	5995 6006 6008,6009, 6010 6015 6019,6022, 6027,6030,	*06*,*10*,10,05, 00,*18*,*04*,*11*, 12,*14*,10 *04*, 19,10,*19*,*16*, 08,*05*,16,18
4617	22 14.1	+15 45	7.5	6.88	6006,6030, 6038	02,*11*,05,10, *02*,*04*
4998	15.5	+ 5 17	6.1	5.41	6008,6022, 6038,7474, 7475,7476,	*06*,*04*,02,*14*, 09,11,10,*12*, 01,*17*,10,12
5741	16.5	− 1 53	4.0	3.87	6008,6009, 6010,6022, 6030	05,03,*04*,01, *11*,*19*,16,*03*, 04,12
3894	16.9	+46 2	5.0	4.54	6009,6030, 6038,7474, 7475,7476,	*04*,*05*,04,*10*, 02,*18*,*06*,12, 03,01,14,12
14295	16.9	−46 25	5.9	5.62	6006,6008, 6009,6010, 6015,6019, 6022,6027, 6030,6038,	10,02,05,*01*, *07*,*14*,*06*,*31*, *02*,*05*,14,09, 05,13,*01* *03* *03*,12,13,*02*
13832	18.2	−49 21	7.3	7.43	7110,7111, 7112	02,*13*,17,*06*, 10,*11*
13833	18.3	−49 19	7.6	7.72	7110,7111, 7112	14,*26*,27,*14*, *02*,02
15040	19.3	−38 20	7.4	7.38	7110,7111, 7112	13,*04*,02,08, *06*,*10*
14780	20.4	−37 46	8.5	9.16	7110,7111, 7112	00,*09*,*01*,*01*, 03,10
14210	20.6	−48 52	9.5	10.00	7474,7475, 7476	01,06,10,*06*, *01*,*07*
14211	20.8	−48 50	9.6	10.18	7474,7475, 7476	24,*21*,*01*,11, *15*,02
13852	21.2	−49 51	7.6	7.50	7110,7111, 7112	12,*11*,01,*03*, 03,*03*
15054	21.7	−38 10	9.1	9.57	7110,7111, 7112	*01*,*01*,*15*,05, 13,01
14219	22.6	−48 35	8.4	8.66	7111,7112, 7112	05,*23*,29,04, 04,*17*
4841	23.1	+39 19	6.0	6.09	6015,6019, 6038,7474, 7475,7476,	02,*01*,*02*,*02*, 02,11,*03*,29, 05,*42*,*01*,05
13867	22 23.2	−49 1	8.1	8.67	7111,7112, 7112	00,*05*,*03*,00, 15,*07*
3899	23.2	−66 54	8.8	8.77	7474,7475, 7476	04,08,*01*,02, *02*,*11*
14810	23.4	−37 28	7.7	7.56	7110,7111, 7112	*04*,13,*28*,*20*, 23,19
3900	23.6	−67 49	7.8	8.10	7474,7475, 7476	23,*18*,01,*29*, 26,*02*
15932	24.2	−27 37	6.3	6.00	6009,6019, 6022,6030, 6038	*13*,*08*,*05*,01, 04,03,08,01, 04,00.
5850	25.4	−11 11	4.8	4.89	6015,6019, 6022,6027, 6030	*02*,02,12,*14*, *05*,*13*,07,07, 00,05
3905	26.0	−67 4	9.4	9.69	7474,7475, 7476	05,07,*13*,*09*, *06*,15
7971	29.4	−58 24	6.1	6.24	6006,6008, 6009,6010, 6015,6019, 6022,6027, 6030,6038,	12,*04*,*09*,*05*, *01*,*11*,*19*,*22*, 12,*02*,11,*01*, 19,*05*,*08*,*04*, 07,15,09,05
16160	33.3	−33 36	5.9	5.70	6006,6008, 6009,6010, 6015,6019, 6022,6027, 6030,6038	*04*,06,06,*18*, *01*,*03*,00,*14*, 04,03,*04*,*07*, *27*,*20*,13,05, 13,09,24,08
4436	37.0	+28 48	4.5	4.80	6015,6022, 6027,7474, 7475,7476,	04,12,*09*,*24*, 06,01,*14*,*03*, 01,06,07,11
4917	51.1	+35 50	6.0	5.76	6019,6022, 6027,7474, 7475,7476	21,*13*,*10*,*09*, 01,*05*,04,*01*, 02,*16*,02,23
4859	54.2	+11 12	6.1	5.87	6038,6039, 6068	*10*,*13*,10,*03*, 04,12
15630	58.0	−35 17	5.3	5.11	6008,6009, 6010,6015, 6019,6022, 6027,6030, 6038,6039	*09*,*16*,*04*,*06*, *12*,*13*,00,*06*, *06*,00,*02*,*02*, 03,10,20,00, 11,06,15,17
4818	58.8	+ 3 17	4.7	4.67	6030,6038, 6039	06,01,*04*,02, 00,*06*
15149	23 1.2	−44 4	4.2	4.28	6008,6009, 6010,6015, 6019,6022, 6027,6030, 6038,6039	*08*,*18*,*02*,*25*, *03*,*10*,11,*10*, *13*,*04*,*04*,*05*, 14,07,10,18, 07,04,25,10
17497	1.3	−24 17	4.4	4.45	6019,6022, 6027,6030, 6038,6039,	*09*,*05*,*17*,*19*, 02,03,*09*,*06*, *18*,*08*,22,09,

DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.
			DM.	Phot.		
	h. m.	° ′				
17255	20 35.4	−29 30	8.7	9.00	7107,7110,	33,*03,09,22*,
					7111	07,*03*
17262	35.7	−29 7	7.7	7.62	7107,7110,	15,36,*10,03*,
					7111	*11,25*
11752	36.7	−52 17	5.0	4.53	5981,5982,	01,*13*,13,08,
					5995,6006,	*06,10*,01,05,
					6008,6009,	08,*01*,07,*08*,
					6010,6015,	*04,08*,09,*14*,
					6019,6022	04,00,14,*03*
4403	38.8	+14 43	4.2	4.34	5995,6009,	04,*08*,09,03,
					6010,7105,	01,*01,07,03*,
					7108,7110,	02,*06*,13,*06*,
					7111	06,*12*
4473	54.1	+ 3 55	5.5	5.26	6009,6110,	01,*03*,05,01,
					6015,7105,	*08,03,02,05*,
					7107,7108,	04,13,*01,01*,
					7110,7111,	15,*08*,00,*21*,
					7112	06,11
15197	55.9	−27 17	6.2	5.99	5981,5995,	07,04,13,09,
					6008,6010,	07,10,13,*03*,
					6015,7105,	15 *02 01,17*,
					7107,7108,	*10*,00,*10,01*,
					7110,7111,	*02,15*,08,*15*,
					7112	*01,01*
6174	21 0.3	−17 38	4.0	4.10	6006,6008,	07,*07*,03,*10*,
					6010,6015,	*01,01,02,18*,
					6019,7105,	14,15,09,*07*,
					7107,7108,	14,*44*,11,*04*,
					7110,7111,	15,*06*,08,06,
					7112	*03,03*
14216	5.8	−40 40	6.1	5.84	5981,5995,	*01,01*,03,04,
					6006,6008,	02,*05,03,21*,
					6009,6010,	*06,16,04,14*,
					6015,6019,	*06,09*,02,10,
					6022,6030,	22,15,17,11
10015	8.6	−53 41	6.2	5.81	5981,5995,	00,*04,07,06*,
					6006,6008,	03,*01,01,18*,
					6009,6010,	*14,13,11,07*,
					6015,6019,	*09,22*,10,04,
					6022,6030	29,44,08,07
16498	11.9	−32 35	4.9	4.74	5981,5995,	01,03,19,*10*,
					6006,6008,	06,*03,10,14*,
					6009,6010,	*04,15*,01,02,
					6015,6019,	*07,05*,10,08,
					6022,6030,	00,14,11,09,
					7105,7107,	*10,09*,04,03,
					7108,7110,	02,*03,01*,07,
					7111,7112	03,*05,01*,04
5512	12.9	− 4 57	6.0	5.81	6008,6010,	*01*,05,13,04,
					6015,6022,	03,*13*,02,14,
					6038,7105,	26,04,*13*,07,
					7107,7108,	*01*,14,*22*,01,
					7110,7111,	*13*,00,*08,20*,
					7112	12,*04*
4431	21 13.5	+38 59	4.5	4.20	6006,6010,	*15*,04,03,17,
					6022,7105,	*08*,04,*18*,10,
					7107,7108,	06,17,*12,14*,
					7110,7111,	01,16,*01,02*,
					7112	*10*,05
4046	13.6	+42 16	6.4	6.11	6008,6015,	*17*,03,01,00,
					6022,7105,	28,05,04,12.
					7108,7110,	20,*14,25*,11,
					7111,7112	*36,12,18*,34
4394	19.7	+24 54	6.5	6.12	6008,6010	05,*04*,05,*05*
4557	21.7	+36 14	6.0	5.96	6015,6022	*08*,08,00,*01*
3937	30.0	−65 16	5.9	6.29	5995,6006,	03,*12,08*,01,
					6008,6009,	*07,19,12,05*,
					6010,6015,	01,*08*,03,*15*,
					6019,6022,	*03*,02,30,20,
					6030,6038,	18,07,00,01
15702	30.4	−26 37	6.0	5.72	5995,6015,	03,*06,07,11*,
					6022,6038,	08,*05*,06,04,
					7107,7112,	16,02,*12,01*
4830	32.7	+ 6 10	6.3	6.18	5995,6038,	*05,12*,06,04
					7107	01,03
4827	33.0	+18 52	5.8	5.42	6015,6038,	*02,10*,04,06
3889	33.6	+44 14	6.4	6.13	6015,6022	00,*05*,09,*04*
2632	36.7	−71 28	6.3	6.09	5995,6006,	06,04,01,16,
					6008,6009,	*08,09,05,13*,
					6010,6015,	*09,07,03,02*,
					6019,6022,	04,14,*22*,16,
					6027,6030	02,08,04,10
6046	37.7	−14 51	6.2	5.88	6008,6022,	*07,14*,00,*12*,
					6030,6038	03,03,16,15
14065	40.4	−46 51	7.4	7.79	7110,7111,	08,*17*,04,*08*,
					7112	01,12
13923	40.7	−46 55	9.4	9.28	7110,7111,	09,00,*01*,13,
					7112	*27*,09
13928	41.7	−47 45	5.8	5.53	5995,6006,	03,*09*,16,09,
					6008,6009,	*10,13,06,04*,
					6010,6015,	05,*07*,05,*05*,
					6019,6022,	09,10,*02,02*,
					6027,6030	*06,08*,03,05
18466	41.9	−31 21	5.2	5.04	5995,6006,	*05,21*,10,00,
					6008,6009,	05,*08*,07,04,
					6010,6015,	*05*,04,*03,12*,
					6019 6022,	16,06,*08 17*,
					6027,6030,	04,07,15 09
4414	42.2	+ 2 14	5.6	5.68	6009,6019,	05,*10*,05 *06*
					6038	09,*03*

DM. No.	R A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.
			DM.	Phot.		
	h. m.	° ′				
16629	19 49.1	−29 14	9.0	10.11	7471,7472, 7473	02,03,*05,06*, 07,*02*
16633	49.3	−29 27	9.3	10.44	7471,7472, 7473	11,09,*17,03*, 03,*06*
16642	49.6	−29 28	8.2	8.64	7105,7107, 7108	07,*14*,13,06, 13,*24*
3829	50.3	+24 4	5.9	5.63	5970,5974, 5981	00,*02,02*,01, 04,*01*
17490	50.6	−30 50	6.6	6.57	7105,7107, 7108	*01,05*,05,19, *07,13*
7557	50.8	−59 52	9.1	9.86	7471,7472, 7473	*07,03,05,01*, *14*,33
16669	51.1	−29 43	8.9	9.43	7105,7107, 7108	06,*11,13*,18, 03,*03*
16679	51.5	−29 21	8.6	9.07	7105,7107, 7108	15,*04,07,21*, 20,*01*
16298	51.8	−28 52	8.1	8.93	7105,7107, 7108	03,*11*,10,00, *08*,08
16309	52.7	−28 55	7.5	8.16	7105,7107, 7108	07,03,30,01, *25,16*
17525	52.7	−30 48	6.5	6.19	7105,7107, 7108	*03,02*,12,*07*, *01*,02
16701	53.0	−29 7	8.2	8.38	7105,7107, 7108	02,15,*16*,07, 14,*21*
16332	54.5	−28 52	7.3	6.92	7105,7107, 7108	01,19,20,01, *27,11*
13686	55.2	−44 44	8.0	7.71	7390,7391, 7410	*07,09*,03,*01*, 20,*05*
13702	56.5	−44 52	8.5	8.30	7390,7391, 7410	*05,05,04*,04, 02,10
13706	57.0	−44 55	8.5	8.44	7390,7391, 7410	*11*,09,16,02, *03,13*
13590	57.5	−45 14	7.9	7.74	7390,7391, 7410	17,08,*27*,02, *10*,13
13603	59.0	−45 16	8.1	8.14	7390,7391, 7410	14,*02,10*,04, 04,*08*
13725	59.2	−44 38	8.0	8.12	7390,7391, 7410	01,14,*17,12*, 07,06
13734	20 0.0	−44 35	8.2	8.34	7390,7391, 7410	13,00,*12,02*, 00,*02*
13744	1.1	−44 29	8.7	8.47	7390,7391, 7410	*16,01*,04,*12*, 17,08
13940	4.6	−36 21	5.8	5.22	5970,5974. 5981,5982, 5955,6006, 6008,6009, 6010,6015	00,*09,03,08*, 18,07,12,14, *08,05,01*,02, *07,01,18,06*, 13,08,*03*,01
13434	5.3	−46 28	9.3	9.00	7105,7107, 7108	21,*01,17,01*, 06,*10*
13445	6.4	−46 30	8.5	8.46	7105,7107, 7108	*06,02*,00,05, *03*,06
13446	20 6.5	−46 54	9.3	9.14	7105,7107, 7108	07,05,00,*19*, 04,04
13448	6.8	−46 52	10.0	9.47	7105,7107, 7108	10,*20*,12,*08*, *12*,18
4227	9.7	+14 54	5.0	4.98	5974,5981, 5982,6010	01,*02* 07 *16*, 06,19,*05,10*
3955	10.8	+36 30	5.4	4.92	5974,5981, 5995	09,01,04,*06*, *09,01*
13869	11.9	−44 51	7.5	7.77	7390,7391, 7410	00,*05,06*,02, 04,06
5642	15.1	−13 4	5.5	4.87	5974,5981, 5982,5995, 6006,6010, 7471,7472, 7473	00,00,05,*06*, 06,14,*04,05*, *06*,08,*02*,03, *04*,09,*03,14*, 12,*08*
14836	15.7	−42 21	5.8	5.64	5974,5981, 5982,5995, 6006,6008, 6009,6010, 6015,6022,	10,*19,11 01* 18,11,*15,03*, 00,05,02,*04*, 13,*09*,02,*05*, 05,*14*,03,08
3986	17.7	+24 7	6.1	5.50	5974,5981, 5995	*05,09*,07,02, 03,*01*
17049	19.3	−28 59	6.1	5.80	5974,5981, 5982,5995, 6006,6010, 7471,7472, 7473	*01,05,01,08*, 13,12,*03,07*, 01,*03*,00,02, *07*,03,03,12, *06,09*
4495	19.5	+ 0 45	6.5	6.24	5974,5981, 5982,6015	*12,04,06*,01, 18,01,06,*02*
4906	23.2	− 3 41	6.4	6.18	5995,6008, 6009,6010, 6015,7471, 7472 7473	*01*,00,*01,05*, *05*,06,*02,03*, *03*,00,01,*06*, *05* 07 19,*03*
1434	29.7	−76 32	7.0	59.8	5974,5981, 5982,5995, 6006,6008, 6009,6010, 6015,6022	18,10,04,*06*, *01,04,01*,05, *01*,00,14,04, 06,*11,04,02*, 00 *08,09,06*,
2977	30.6	+46 21	6.0	5.76	5981,5982, 6008	*01,04*,04,10, *01,06*
3754	32.8	−67 7	5.2	5.17	5974,5981, 5982,5995, 6006,6008, 6009,6010, 6015,6022	*08,03,04,04*, 07,14,14,*08*. 06,*02*,01,*17*, 18,11,*02,04*, *16,14*,08,04
17237	34.0	−29 14	8.2	8.61	7105,7107, 7110	08,*07*,05,*07*, *02*,03
17250	35.2	−29 17	9.1	9.48	7107,7110, 7111	10,04,05,01, *01,06*

DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.
			DM.	Phot.		
	h. m.	° ′				
					7077	*07*,02
4460	18 57.6	− 3 51	5.7	5.43	5970,5973,	*08,01*,01,*01*,
					5974,5981,	*01*,07,06,06,
					5982,6009,	07,03,12,08,
					6724,6725,	*13*,02,*01*,00,
					7390,7391	*08*,01,*19*,04
2602	58.6	+46 47	5.5	4.93	5973,5974,	08,*08,02,11*,
					5981,6724,	11,08,*07,06*,
					7410	06,04
47	59.7	−89 15	5.7	5.48	5961,5970,	*04,13*,05,16,
					5973,5974,	*06,15,09*,10,
					5981,5982,	*08*,05,02,11,
					5995,6006,	02,01,10,10,
					6008,6009	*03,03,06,13*
3640	19 2.5	+24 6	5.4	5.80	5973,5974,	05,01,02,*15*,
					5981,6009,	08,*02*,09,*01*,
					7076,7077,	*01*,12,*05,09*,
					7410	*07,02*
13933	3.0	−42 3	6.2	5.93	5961,5970,	06,*10,04*,01,
					5973,5974,	*01*,00,01,06,
					5981,5982,	03,03,00,*03*,
					5995,6006,	*13,06*,09,*07*,
					6008,6009	*01*,00,10,08
3485	3.7	+35 57	5.2	5.25	5970,5973,	*02,01*,06,08,
					5981,6724,	*06,03*,01,*02*,
					7410	00,03
3824	8.7	+ 2 7	5.6	5.14	5961,5973,	*15*,03,09,07,
					5981,6008,	*05,08,05,01*,
					7076,7077,	*08,12*,05,16,
					7410	16,04
13866	9.4	−25 26	5.4	4.82	5961,5970,	*10,11,01,06*,
					5974,5981,	*02,08,03,19*,
					5982,6008,	*07,16,03,02*,
					6724,7076,	02,04,12,10,
					7077,7390,	22,04,*02*,16,
					7391	14,13
13296	26.1	−45 29	6.0	5.66	5961,5970,	*07*,03,02,02,
					5974,5981,	00,*03*,13,*01*,
					5982,5995,	11,*02,09,12*,
					6006,6008,	02,*10,04,12*,
					6009,6010	12,*03*,13,00
15442	29.9	−24 56	6.0	5.67	5970,5973,	*01,06,03*,01,
					5974,5981,	09,06,10,*09*,
					5995,6009,	*06,01*,23,*04*,
					6724,7076,	19,06,*16*,01,
					7077,7390,	*18,05,02,18*,
					7391	*03*,13
2438	29.9	−71 42	8.8	9.13	7105,7107,	21,03,*07*,30,
					7108	*15,31*
3782	31.6	− 1 31	4.2	4.37	5970,5974,	*01,07*,00,08,

DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.
			DM.	Phot.		
	h. m.	° ′				
					5981,5982,	02,*12*,04,07,
					5995,6008,	*03,11*,02,04,
					6724,7076,	11,02,*02*,02,
					7077,7390,	02,*20*,06,01,
					7391	00,03
4225	19 34.3	+ 5 10	5.0	5.24	5970,5974,	05,*07*,16,04,
					5981,6009,	10,01,01,03,
					7076,7077,	*08,18*,07,*24*,
					7390,7391,	11,04,*11*,23,
					7471,7472,	*02,22,04,08*,
					7473	02,24
4098	36.5	+13 35	5.8	6.03	5961,5970,	07,*06*,09,*07*,
					5974,6008,	17,10,08,03,
					7076,7077,	12,05,03,*12*,
					7471,7472,	*13,09,08,16*,
					7473	00,04
5444	37.8	−15 42	6.0	5.46	5961,5970,	06,*06*,03,*07*,
					5974,5981,	09,04,*03,11*,
					5982,6009,	00,*17,01*,04,
					7076,7077,	06,*02*,17,09,
					7390,7391	10,*01,12,11*
2447	38.3	−72 3	9.2	9.05	7105,7107,	25,*01,14,08*,
					7108	*05*,02
2448	38.6	−72 8	9.0	8.70	7105,7107,	09,*18,04,06*,
					7108	13,09
3531	38.9	+32 11	6.0	5.95	5961,5970,	19,*03*,07,06,
					5974,6009,	14,*07,19,12*,
					7471,7472,	*13,08*,06,01,
					7473	10,03
15443	39.6	−32 8	6.3	5.55	5970,5974,	*04,07*,17,*01*,
					5981,5982,	03,*06,10,13*,
					5995,6006,	*15,25*,16,11,
					6008,6009,	02,*04*,11,05,
					6010,6015,	06,10,04,*09*,
					7390,7391	09,*03,09*,04
9290	39.9	−56 36	6.2	5.38	5970,5974,	09,*10,12,05*,
					5981,5982.	*05,10,03,01*,
					5995,6006,	*07,17*,08,11,
					6008,6009,	04,07,*08,01*,
					6010,6015	*01*,14,22,*03*
2480	42.7	−71 39	7.6	7.66	7105,7107,	25,15,*08,24*,
					7108	05,*14*
2467	44.9	−72 36	8.4	8.71	7105,7107,	10,*07*,08,*05*,
					7108	05,*09*
2470	45.9	−72 22	8.2	7.99	7105,7107,	*04,14,12*,08,
					7108	19,01
7545	47.0	−59 40	9.2	9.94	7471,7472,	28,*02,25,26*,
					7473	23,01
3902	47.2	+40 20	5.5	5.75	5961,5970,	08,11,01,*05*,
					5974,6010	00,*18,02*,02

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			DM.	Phot.		
	h. m.	° ′				
					6725	11,16
4619	18 7.4	−22 45	8.3	8.50	5961,6724, 6725	*01*,26,*12*,*18*, *05*,07
8706	8.7	−56 4	6.6	5.42	5945,5946, 5961,5963, 5970,5973, 5974,5981, 5982,5995	*14*,*20*,*02*,01, *06*,*05*,18,39, *06*,00,*01*,*11*, 00,05,*04*,*05*, 07,01,05,*06*
357	10.3	−86 16	8.5	8.22	7028,7030, 7033,7035	08,*13*,*11*,00, 28,*04*,04,*12*
4648	11.1	−22 12	8.5	8.42	5961,6724, 6725	*06*,00,*11*,*02*, 25,*03*
12675	11.1	−34 8	8.7	8.58	5961,6725	00,00,*06*,07
4655	11.9	−22 22	8.2	7.97	5961,6724, 6725	*18*,*16*,01,*19*, 16,36
3035	12.5	+42 8	5.5	5.56	5970,5973, 5974	02,*07*,09,*01*, 04,*09*
4702	17.0	−22 39	9.1	9.22	5961,6724, 6725	01,*07*,06,*31*, 13,17
12569	17.0	−44 9	5.7	5.32	5945,5946, 5961,5970, 5973,5974, 5981,5982, 5995,6006	*08*,*07*,*08*,*01*, 01,*08*,04,02, *01*,*09*,03,00, 03,*03*,18,*07*, 01,*06*,17,03
5024	17.6	−12 3	5.5	5.75	5945,5973, 5974,5981, 5982,5995, 7035,7413	00,00,03,*02*, *01*,01,03,*02*, 08,07,*02*,*02*, *07*,04,00,*09*
3411	19.4	+21 43	4.5	3.77	5945,5946, 5974,5995, 7035	06,*11*,*02*,02, *08*,*06*,02,*11*, 21,11
14147	20.1	−32 58	8.5	8.73	7059,7076, 7077	21,*05*,*13*,03, 05,*09*
4722	20.5	−22 15	9.2	9.43	5961,6724, 6725	*16*,*13*,05,*25*, 22,28
13225	20.9	−33 28	7.3	7.03	7059,7076, 7077	*02*,*08*,03,*09*, 11,04
13239	21.6	−33 24	8.5	8.62	7059,7076, 7077	*14*,*02*,03,*09*, 13,06
13249	22.2	−33 32	8.3	8.90	7059,7076, 7077	22,*08*,*02*,03, *14*,00
13252	22.4	−33 36	9.0	9.70	7059,7076, 7077	*16*,00,*02*,17, *12*,14
13258	22.9	−33 22	9.3	9.21	7059,7076, 7077	*09*,00,*03*,07, *09*,12
13272	23.6	−33 11	8 5	8.38	7059,7076, 7077	*09*,08,*20*,*02*, 15,10
13281	24.5	−33 3	5.8	5.42	5945,5946, 5961,5970, 5973,5974, 5981,5982, 5995,6006, 7035,7410, 7413	*02*,*03*,08,03, *02*,*04*,01,*07*, 02,*09*,*03*,*15*, *02*,*15*,10,04 12,01,17,*02*, 12,*02*,02,*07*, *03*,*08*
14572	18 32.4	−23 36	6.1	5.78	5945,5970, 5973,5974, 5981,5995, 6725,7410, 7413	06,00,09,00, *09*,10,*01*,*21*, 11,02,*04*,01, 02,16,*02*,*01*, *18*,00
3521	32.5	− 0 24	5.5	5.79	5946,5970, 5973 5981, 5982,6006, 6725,7410	01,10,*02*,01, *01*,*05*,*05*,00, 07,16,02,*04*, *20*,07,01,*02*
3154	32.9	+33 23	5.8	5.39	5970,5973, 5974	*03*,10,*03*,12, *09*,*05*
1939	37.4	−73 6	6.5	6.13	5945,5946, 5961,5970, 5973,5974, 5981,5982, 5995,6006	*14*,*24*,04,09, *01*,*17*,01,11, *06*,*03*,*06*,12, *04*,*19*,23,06, 12,01,12,01
3754	38.8	−65 11	5.9	5.75	5945,5946, 5961,5970, 5973,5974, 5981,5982, 5995,6006	*05*,*06*,20,08, *13*,*10*,02,02, 01,06,11,*14*, *05*,*11*,09,04, 08,00,10,*09*
12982	49.9	−37 28	5.0	5.43	5945,5946, 5961,5970, 5973,5974, 5981,5982, 5995,6006, 7410	04,00,01,*05*, *05*,04,*12*,*07*, *01*,07,11,*09*, 08,*04*,06,*03*, *04*,*03*,06,11, *02*,*10*
9402	50.5	−53 4	5.2	4.90	5945,5946, 5961,5970, 5973,5974, 5981,5982, 5995,6006	10,10,*04*,00, 06,*02*,*02*,06, 03,*03*,*11*,*01*, 01,*13*,08,08, *08*,*05*,01,*04*
13204	53.0	−36 55	8.5	9.05	7059,7076, 7077	04,*07*,12,*13*, 03,*01*
13012	53.5	−37 24	8.7	9.78	7059,7076, 7077	12,03,*11*,*02*, 19,*18*
5172	53.8	−12 58	5.5	5.55	5970,5973, 5974,5981, 5982,6006, 6725,7390, 7391	04,09,*05*,*07*, 07,06,02,01, *02*,01,03,06, *11*,*10*,*11*,07, *21*,19
3841	54.5	+13 30	5.3	5.19	5970,5973, 5974,6006	04,*12*,05,03, 02,00,00,00
13235	55.1	−36 47	8.5	8.90	7059,7076, 7077	12,00,00,*09*, *08*,08
13249	56.0	−36 48	8.0	8.58	7059,7076,	*01*,*06*,13,00,

DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.	DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.
			DM.	Phot.						DM.	Phot.		
	h. m.	° ′						h. m.	° ′				
11458	17 16.2	−45 7	9.0	9.00	7411,7413,	02,00,22,*17*,						5982,6725,	06,*25*,12,04,
					7414	*14*,10						7028,7035,	10,11,*02*,*16*,
11462	16.3	−45 5	9.2	9.12	7411,7413,	*10*,*06*,05,04,						7059,7411	10,08,*07*,00
					7414	07,02	2349	17 36.6	+46 4	4.0	3.85	5945,5963,	*05*,*01*,03,19,
4594	17.6	−21 37	8.2	8.34	5961,5963,	*26*,*09*,11,30.						5974,7028,	02,03,15,*13*,
					5982	*06*,03						7059	*01*,*20*
11506	18.3	−45 11	8.3	8.20	7411,7413,	12,03,07,*04*,	8799	42.3	−53 35	6.5	5.75	5945,5946,	07,04,*02*,*14*
					7414	*08*,*13*						5961,5963,	00,*13*,19,*06*,
11703	18.4	−44 42	8.1	7.90	7411,7413,	19,02,*17*,*07*,						5970,5973,	*02*,02,01,*03*,
					7414	04,*03*						5974,5981,	09,03,*03*,03,
11725	19.2	−44 33	8.1	7.74	7411,7413,	*04*,*27*,10,*03*,						5982,5995	04,*04*,07,*05*
					7414	09,12	2888	42.5	+27 47	3.5	3.36	5946,5970,	01,01,02,04,
4605	20.4	−21 18	9.0	10.20	5961,5963,	*22*,15,00,*02*,						5974,7028	*03*,00,07,*08*
					5982	14,*02*	3334	42.7	+17 46	5.5	5.77	5945,5963,	*08*,*26*,30,15,
11743	20.4	−44 44	9.2	9.36	7411,7413,	*03*,*10*,26,*01*,						5974	*02*,*11*
					7414	11,*24*	12203	46.7	−34 52	6.8	5.49	5945,5946,	*07*,*14*,05,*04*,
11748	20.7	−44 39	9.0	8.72	7411,7413,	*02*,*06*,05,11,						5961,5963,	*09*,*12*,14,22,
					7414	*04*,*06*						5970,5973,	02,*05*,03,*06*,
3368	21.5	+ 7 41	6.5	6.08	5946,5970,	*06*,*15*,03 *13*						5974,5981,	03,*04*,*06*,*03*,
					5974,7059,	*04*,*06*,02,12,						5982,5995	09,*04*,03,17
					7411	06,17	13878	50.4	−28 3	6.0	5.83	5945,5946,	*19*,*12*,06,02,
11840	25.5	−44 57	9.1	8.98	7411;7413,	02,*05*,01,03,						5970,5973,	09,*15*,*05*,*04*,
					7414	*03*,01						5981,5982,	02,02,*03*,00,
11859	26.8	−44 56	7.1	7.00	7411,7413,	15,*10*,07,*23*,						6725,7035,	01,*13*,03,09,
					7414	01,07						7411,7413	18,16,11,*08*
4641	27.2	−21 41	9.0	9.63	5961,5963	*12* *13*,22,21,	2982	52.8	+37 16	3.5	3.75	5946,5970,	14,*03*,*08*,*13*,
					5982	*08*,*11*						5974,7035	*03*,*08*,*01*,23
4461	28.1	− 5 40	6.2	5.64	5941,5946,	*07*,08,*03*,*05*,	4480	53.6	−22 57	9.0	9.17	5961,5963,	07,04,34,19,
					5970,5973,	*11*,01,*05*,13,						6724	*38*,*28*
					5981,7028,	05,06,02,*05*,	4511	56.5	−22 46	9.1	9.09	5961,5963,	00,20,20,28,
					7059,7411	03,09,00,*09*						6724	*40*,*26*
4648	28.3	−21 46	9.1	9.94	5961,5963,	*13*,*05*,01,21,	4555	59.8	−22 13	9.0	8.94	5961,5963,	*08*,*05*,30,19,
					5982	*12*,07						6724	*17*,*19*
469	30.0	−85 11	7.3	6.48	7028,7030,	03,13,*06*,*05*,	3482	18 0.4	+ 2 31	4.0	3.87	5945 5973,	03,*07*,*04*,*07*,
					7033	07,*09*						5974,5982	13,*01*,05,01
11616	32.6	−49 21	5.6	4.77	5945,5946,	*13*,*18*,19,08,	4316	2.5	−63 52	9.0	9.84	7033,7035,	*20*,03,00,*11*,
					5961,5963,	*01*,*16*,22,15,						7059	24,02
					5970,5973,	*04*,*01*,04,02,	3826	2.5	−64 0	8.3	7.68	7033,7035,	*15*,*29*,09,*04*,
					5974,5981,	*03*,*07*,*07*,*05*,						7059	12,27
					5982,5995	09,02,01,00	4581	2.7	−22 10	8.5	7.90	5961,5963,	04,*05*,46,16,
11917	33.2	−43 48	9.0	8.22	7028,7033,	*17*,*09*,*20*,19,						6724	*21*,*40*
					7035	15,10	3675	4.6	+20 1	5.5	5.13	5945,5946,	*07*,03,03,03,
11926	33.9	−43 34	9.4	9.10	7028,7033,	*01*,04,03,*10*,						5974,5995	*05*,*04*,05,04
					7035	08,*05*	4597	4.7	−22 16	8.0	7.89	5961,5963,	03,*07*,*10*,15,
11938	34.9	−43 38	9.5	9.00	7028;7033,	*05*,09,*04*,*05*,						6724	*01*,00
					7035	09,*01*	4346	6.5	−63 19	9.0	9.12	7033,7035,	*09*,01,07,22,
11940	35.2	−43 31	7.9	7.39	7028,7033,	17,*03*,*12*,*11*,						7059	01,*20*
					7035	26,*18*	4349	6.8	−63 22	8.2	8.53	7033,7035,	03,*09*,09,20,
4808	35.8	−12 49	4.5	4.28	5945,5946,	*03*,*08*,*06*,02,						7059	03,*26*
					5963,5970,	21,13,*14*,*10*,	4613	6.9	−22 29	9.1	8.87	5961,6724,	*05*,00,*14*,*06*,

DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.	DM. No.	R. A. 1900.	Dec. 1900.	Magn.		Julian Days.	Residuals.
			DM.	Phot.						DM.	Phot.		
	h. m.	° ′						h. m.	° ′				
3164	16 19.3	+ 7 10	6.0	6.00	5963,6278,	07,00,09,21,	3230	17 3.1	− 0 57	6.2	6.08	5941 5961	11,09,06,*13*,
					6309	*25,09*						5963,5970,	*18,07*,03,06,
6800	19.8	−58 23	6.2	5.75	5941,5945,	08,*11*,08,*07*,						5973,7033,	03,*06,06*,14,
					5946,5961,	04,*07,05,10*,						7414	*03,06*
					5963,5970,	24,15,*09*,02,	11485	5.0	−43 6	3.6	3.30	5941,5945,	07,*20*,05,*10*,
					5973,5974,	*06,09,01,09*,						5946,5961,	*01,04,05,15*,
					5982,6278	05,01,12,04						5963,5970,	05,*07*,06,*10*,
3049	20.8	+14 16	5.2	4.65	5961,5974,	*08,03,13*,02,						5973,5974,	05,09,02,01,
					6309,7411	05,*01*,15,01						5981,5982	12,11,14,00
2750	21.9	+37 37	5.7	5.56	5946,5963,	*14*,02,15,03,	266	5.4	−87 11	9.2	8.33	7028,7030,	*15*,13,17,15,
					6309,7030,	*08*,02,00,01,						7033	*14,14*
					7411,7414	*05*,07,*08*,04	267	6.1	−87 18	8.8	7.90	7028,7030,	11,09,05,*07*,
259	23.0	−87 24	7.8	6.63	7028,7030,	07,*07*,08,*10*,						7033	*21*,03
					7035	*07*,08	11848	7.3	−33 16	9.4	9.84	7035,7059,	10,*12*,13,*09*,
12695	24.1	−24 54	5.5	4.88	5941,5961,	*01*,01,07,02,						7076	00,*01*
					5963,5973,	14,*04,18,09*,	11853	7.6	−33 6	8.9	9.02	7035,7059,	04,14,05,*07*,
					6309,6317,	08,07,*02,06*,						7076	*16,02*
					7028,7030	*08,15,10*,29	11865	8.1	−33 18	8.9	9.28	7035,7059,	00,*24*,13,21,
10900	27.0	−43 50	5.5	4.94	5941,5945,	*06*,03,10,*01*,						7076	*06,02*
					5946,5961,	04,*02,11,11*,	11874	8.7	−33 4	8.5	8.35	7035,7059,	*04*,03,15,*04*,
					5963,5970,	05,07,*05*,00,						7076	*07,05*
					5973,5974,	00,*05,08,09*,	11875	8.7	−33 26	5.8	5.58	5941,5945,	*13,07,01,13*,
					5981,5982	19,01,14,*02*						5946,5961,	*06,04,08,09*,
11109	29.5	−34 53	9.0	9.56	6309,6317	03,02,*03,04*						5963,5970,	*14,03,03,01*,
11042	29.8	−35 6	9.0	9.33	6309,6317	*10,01*,05,05						5973,5974,	00,*19*,13,*02*,
4467	32.6	− 6 20	6.2	6.07	5941,5945,	11,02,10,10,						5981,5982,	06,04,*03*,01,
					5946,5963,	03,*03,03,04*,						7033,7035,	*04*,25,*06*,19,
					5970,7028,	10,07,02,20,						7059,7414	05,15,12,23
					7030,7414	*19,17,15,10*	*2719*	11.0	−70 1	5.7	5.46	5941,5945,	*03,09*,02,01,
3272	42.8	+ 5 25	5.3	5.28	5945,5961,	02,10,*03,04*,						5946,5961,	17,09,*19,15*,
					5970,7028,	*09,05*,00,*05*,						5963,5970	00,*17*,03,06,
					7030,7411,	32,*12*,02,*10*,						5973,5974,	05,*02*,07,*07*,
					7413,7414	05,07,*05,02*						5981,5982	06,04,06,12
2220	46.3	+46 10	5.0	4.83	5941,5946,	04,05,*04*,00,	2844	11.6	+36 55	3.0	2.99	5961,5973,	*10,04*,00,04,
					5970,7028,	01,*03,06*,09,						5974,7413	*07,07*,12,13
					7059,7413,	05,*10*,03,00,	11408	13.5	−45 19	7.6	7.04	7411,7413,	10,38,26,00,
					7414	01,*07*						7414	*29,44*
4249	50.8	−22 59	5.5	5.63	5941,5945	00 *05*,12,12,	4577	14.0	−21 25	8.7	9.66	5961,5963,	*09,05*,04,*01*,
					5946,5961,	*07,04*,02,*03*,						5982	*04*,13
					5970,7033,	*05,08*,00,03,	4773	14.1	−17 39	6.0	6.06	5945,5961,	*03,04*,07,13,
					7414	10,*07*						5963,5970,	*14,13*,03,*06*,
8265	55.9	−57 34	6.6	5.82	5941,5945,	*04,05*,01,01,						5973,5974,	05,*06*,10,*03*,
					5946,5961,	*13,07,10,12*,						7035,7059	06,00,02,*03*
					5963,5970,	09,07,*01*,05,	5558	14.6	−62 46	5.9	5.77	5941,5945,	21,*04*,08,*04*,
					5973,5974,	07,00,14,00,						5946,5961,	00,*07,15,24*,
					5981,5982	10,02,*03*,01						5963,5970,	*07,13*,19,09,
3142	17 0.7	+12 53	4.5	4.95	5945,5946,	*04*,02,10,04,						5973,5974,	*09*,07,03,06,
					5970,7033,	*11,19*,02,14,						5981,5982	07,*04*,10,04
					7059,7413,	07,*11*,10,05,	3246	16.1	+25 37	6.0	5.45	5945,5970,	09,*01*,00,*01*,
					7414	*05,03*						5974	*06*,00

ANNALS OF HARVARD COLLEGE OBSERVATORY. VOL. LXIV. NO. II.

THE VARIABLE STAR SS CYGNI. 213843.

BY LEON CAMPBELL.

THE variability of SS Cygni, 213843, was discovered in 1896 by Miss Wells, and was announced in H. C. 12. During a large part of the time it is faint, and approximately of the twelfth magnitude. At somewhat irregular intervals it increases suddenly in brightness by nearly four magnitudes, and then slowly diminishes. U Geminorum, 074922, is the only other star, previously discovered, whose variations are of this class. Since the discovery of the variability of SS Cygni, this star has been under careful observation here, both visually and photographically. Before January 1, 1906, 1725 visual observations were made of SS Cygni, by the method of Argelander, and have been published in H. A. 37, Part II, and H. A. 57, Part I. 295 later observations were made in the same way before November 6, 1907. Professor O. C. Wendell has made 153 observations with a polarizing photometer attached to the 15-inch Equatorial, and the Director has measured it on 75 nights with the 12-inch Meridian Photometer. 1217 photographic observations have been made, from 979 plates of the Henry Draper Memorial, the first taken on September 19, 1890. The bibliography of variable stars, by Miss A. J. Cannon, in process of publication, in H. A. 55, has been examined, and a large number of references to observations, made elsewhere, have been taken from it. An excellent series has been published by Mr. J. A. Parkhurst in Popular Astronomy, and in the Astrophysical Journal. They contain 362 of his own observations, 380 made by Zaccheus Daniel, and 119, by W. E. Sperra. They are reduced to the same system, and means are provided for reducing them to the same photometric scale as the Harvard observations. Besides the series of Mr. Parkhurst, Messrs. Daniel and Sperra have published other observations in Popular Astronomy and the Astronomical Journal. These number 60 and 64, respectively, and are published in a form easily reduced to the Harvard scale of magnitudes. Mr. P. S. Yendell has 37 observations in the Astronomical Journal, on the same scale as Mr. Parkhurst. The 29 observations of Mr. H. M. Parkhurst in the same publication have been used as published, as well as 21 by Mr. David Flanery, and 29 by Miss Rose O'Halloran, since no ready means were apparent for reducing them to the Harvard scale. The 46 observations by Professor E. Hartwig in the Astronomische Nachrichten could be reduced, and this has been done. The total number of observations used in this discussion is, therefore, 4612, divided as follows: Harvard visual, 2020; mainly by Miss Cannon, L. Campbell, F. E. Seagrave, and H. R. Colson; Harvard photographic, 1217, by Mrs. Fleming, Miss Breslin, and Miss Leland; Harvard photometric, 228, by E. C. Pickering and O. C. Wendell; Z. Daniel, 440; J. A. Parkhurst, 362; W. E. Sperra, 183; E. Hartwig, 46; P. S. Yendell, 37; H. M. Parkhurst, 29; Miss O'Halloran, 29; and David Flanery, 21. The discussion given below is based upon the observations preceding J. D. 7900, but observations from J. D. 7900 to 8200 have been added to Tables II, VIII, IX, XI, and XII.

Table I provides the means of reducing the Harvard photographic observations to the photometric scale, the differences amounting to about a magnitude.

Having reduced these observations, as nearly as possible to a uniform scale, they were plotted and a smooth curve drawn through the points where the observations justified this step. From an examination of these curves it is very evident that for a greater part of the time the variable underwent a series of light changes, which can be classified as alternately long and short maxima, interspersed here and there by an occasional anomalous maximum. The term maximum is here used to denote the whole time when the variable is increasing or decreasing in brightness. Owing to insufficient observation of some of the maxima, it was difficult to determine with certainty the type of maximum in all cases. Therefore, it was necessary in several instances to make assumptions. If more observations had been obtained, they might have changed the classification of the maximum, and, consequently, the form of the curve. Table II gives, in the successive columns, the year, month, and day, Julian day, magnitude at maximum, class of maximum, and the times when the brightness, for each half magnitude given in the heading, was attained. The classes of maxima, whether "long," "short," or "anomalous," are represented by the letters, L, S, and A, respectively. Italics denote somewhat uncertain values due to the lack of sufficient observations.

TABLE I.

PHOTOGRAPHIC SCALE.

Ptg.	Ptm.
7.0	7.8
7.5	8.3
8.0	8.9
8.5	9.5
9.0	10.1
9.5	10.7
10.0	11.3
10.5	11.7
11.0	12.1
11.5	12.4

TABLE II.

DATES OF MAXIMA AND COORDINATES OF LIGHT CURVES.

Date.			J. D. Max.	Max. Magn.	Cl.	11.5	11.0	10.5	10.0	9.5	9.0	8.5	8.5	9.0	9.5	10.0	10.5	11.0	11.5
y.	*m.*	*d.*																	
90	9	20	*1631.2*	..	S	..	..	*30.2*	*30.5*	*30.8*	..	..	..	..	..	33.7	34.7	35.7	..
	11	3	*1675.1*	8.3	L	..	..	..	..	..	..	*70.2*	*80.0*	..	..	..	..	..	..
91	8	11	*1956.8*	..	*L*	..	..	..	..	..	..	..	..	..	66.0	67.3	..	..	..
	11	2	*2038.9*	..	*L*	..	..	..	..	*34.6*	*35.7*	..	..	..	..	..	..	..	..
	12	11	2079.3	8.3	S	..	..	..	..	..	77.6	*78.2*	80.8	82.3	83.4	84.4	85.7	87.4	..
93	10	14	2754.5	8.3	L	..	..	..	..	..	..	*51.0*	*59.0*	..	..	..	..	..	..
94	8	7	3048.7	8.3	L	..	..	..	..	..	..	..	*52.2*	*55.1*	*57.5*	*59.3*	*66.1*	*62.5*	..
95	12	14	3539.3	..	S	..	37.0	37.3	37.6	..	..	..	..	..	..	..	..	..	..
96	8	1	*3807.5*	8.4	*L*	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	9	9	3846.8	..	S	..	43.2	43.4	43.6	43.8	44.1	..	..	..	52.1	52.7	53.6	55.1	..
	11	21	3885.1	8.8	A	..	76.1	77.7	79.5	81.1	83.1	..	..	87.2	89.3	90.5	91.6	92.9	..
97	1	17	3942.6	8.4	L	..	36.0	36.3	36.7	37.1	37.5	38.8	46.4	50.0	52.4	54.3	55.9	57.5	60.0
	3	22	4006.6	8.4	S	03.8	04.0	04.2	..	..	..	04.8	17.7	10.1	11.1	12.1	13.0	14.2	15.2
	4	27	4042.2	8.7	A	37.5	*37.9*	*38.5*	*39.0*	*39.5*	40.5	..	..	43.5	44.5	45.2	46.2	47.4	49.5
	6	8	4083.8	8.4	L	78.3	78.7	78.9	79.1	79.4	79.7	81.0	88.2	91.5	93.0	94.2	95.3	96.3	97.6
	8	10	4147.3	8.5	S	44.8	45.0	45.1	45.2	45.3	45.5	..	..	50.4	52.0	53.5	54.6	55.5	56.5
	10	2	4200.2	8.4	L	95.4	95.6	95.8	96.0	96.2	96.4	97.1	03.2	07.7	09.4	10.5	11.5	12.2	13.1
	12	2	4261.2	8.4	S	59.2	59.3	59.4	59.5	59.6	59.7	59.8	61.6	64.1	65.8	67.1	68.3	69.5	70.5
98	1	21	4311.4	8.4	L	06.7	06.8	07.0	07.2	07.4	07.5	08.2	15.5	18.8	20.8	22.3	23.2	23.9	24.6
	3	23	4372.2	8.2	S	69.5	69.7	69.9	70.1	70.3	70.5	70.7	74.8	76.0	77.0	78.0	79.1	80.0	81.2
	6	1	4432.0	8.3	L	27.0	27.2	27.4	27.7	27.9	28.1	28.8	35.6	39.6	41.5	42.9	44.1	45.3	46.4
	7	31	4492.6	8.4	S	90.7	90.9	91.1	91.2	91.4	91.5	91.8	93.5	95.5	96.8	97.9	98.7	99.7	00.9
	9	18	4541.9	8.3	L	37.1	*37.4*	*37.6*	*37.8*	*38.1*	38.3	39.0	46.2	49.0	50.8	52.1	53.1	53.9	55.0
	11	12	4606.4	8.4	S	04.3	04.5	04.7	05.0	05.2	05.5	05.7	07.7	09.3	10.3	11.2	12.1	12.9	13.7
99	1	10	4665.7	8.4	L	60.8	61.1	61.4	61.7	62.0	62.2	62.8	68.6	73.2	75.1	76.4	77.3	79.0	80.7
	3	8	4722.8	8.3	S	20.8	21.2	*21.3*	*21.5*	*21.6*	*21.7*	21.9	24.7	25.8	26.5	26.9	27.3	..	..
	5	6	4780.8	8.3	L	75.9	76.2	76.4	76.6	76.8	77.1	77.6	86.1	88.5	90.0	90.9	91.8	92.8	93.8
	7	5	4840.6	8.6	S	37.0	37.4	37.7	37.9	38.1	38.4	..	..	43.9	45.8	47.2	48.5	49.7	50.9
	8	28	4894.2	8.4	L	89.4	89.5	89.6	89.7	89.8	90.0	90.9	97.8	02.7	04.0	04.6	05.2	06.1	08.0
	10	27	4954.8	8.5	S	52.5	*52.7*	*52.9*	*53.1*	53.2	53.4	53.9	55.0	57.8	59.7	60.9	62.0	62.9	64.0
	12	2	4990.2	8.8	A	79.7	81.6	83.5	85.3	87.2	89.2	..	..	91.8	93.6	94.8	96.0	97.1	98.2
00	1	5	5025.2	8.4	L	*19.8*	*20.2*	*20.4*	*20.7*	*21.0*	21.2	22.0	28.6	32.1	33.8	..	..	..	..
	3	8	5087.1	8.4	L	82.8	*83.2*	..	..	..	..	85.8	91.7	94.1	95.1	96.0	96.8	97.7	98.6
	4	27	5137.2	8.4	S	34.9	35.1	35.4	35.6	35.8	36.1	36.4	38.7	40.2	41.1	42.0	43.0	43.9	4.48
	7	4	5205.0	8.3	L	99.7	99.8	00.0	00.2	00.3	00.5	01.2	09.4	12.8	14.7	15.9	17.0	17.9	19.1
	10	24	5317.3	10.7	A	16.2	16.9	..	..	..	..	..	..	..	..	..	..	18.3	19.4
	11	9	5333.9	8.3	L	..	..	..	..	..	..	30.2	37.5	41.6	43.4	44.5	45.4	46.3	47.4
	12	24	5378.2	8.4	S	76.4	76.6	76.8	77.0	77.2	77.4	77.7	79.3	80.6	81.7	82.4	84.0	85.0	86.2
01	2	5	5421.0	8.3	L	..	..	..	..	..	..	18.4	25.9	28.6	29.9	31.0	31.7	32.5	33.3
	3	31	*5475.0*	8.4	*S*	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	5	12	5517.2	8.3	L	12.5	12.7	12.8	13.0	13.2	13.3	13.7	22.5	24.4	25.8	27.0	27.7	28.6	29.6
	7	8	5574.6	8.4	S	72.5	72.7	72.9	73.1	73.3	73.5	73.7	75.8	77.8	79.0	79.8	80.7	81.7	83.0
	8	22	5619.6	8.3	L	15.3	15.5	15.7	15.9	16.1	*16.3*	*17.1*	24.2	26.1	27.3	28.5	29.6	30.8	32.2
	10	16	5674.2	8.3	S	..	..	..	72.3	72.5	72.7	73.0	75.7	77.5	78.9	80.0	80.7	81.5	82.3
	12	7	5726.8	8.3	L	..	..	..	..	23.4	23.5	23.7	31.0	34.0	35.8	37.1	38.2	39.0	40.4
02	2	4	5785.6	8.4	S	..	..	..	..	..	..	84.5	86.9	89.2	90.5	91.4	92.3	93.4	94.5

Date.			J. D. Max.	Max. Magn.	Cl.	11.5	11.0	10.5	10.0	9.5	9.0	8.5	8.5	9.0	9.5	10.0	10.5	11.0	11.5
y.	m.	d.																	
02	4	5	5845.7	8.2	L	..	..	..	..	..	..	..	50.7	53.3	54.8	55.8	56.8	58.1	59.5
	5	20	5890.2	8.6	A	82.4	83.8	85.0	86.2	87.3	88.3	..	..	92.3	93.4	94.4	95.3	96.3	97.4
	7	19	5950.6	8.2	L	45.7	45.9	46.2	46.5	46.7	47.0	47.3	55.5	57.4	58.8	60.1	61.4	62.8	64.0
	9	8	6001.5	8.2	S	99.6	99.8	00.0	00.1	00.2	00.3	00.5	03.7	04.2	04.6	05.1	05.7	..	..
	11	9	6063.8	8.1	L	59.5	59.7	59.8	60.0	60.2	60.3	60.4	69.1	71.9	73.8	75.1	76.0	76.8	77.8
	12	30	6114.0	8.3	S	..	..	..	*11.3*	*11.5*	*11.7*	*12.0*	16.5	17.9	19.1	20.0	20.8	21.7	22.7
03	2	12	6158.0	8.8	A	49.0	50.2	51.7	53.0	54.5	56.4	..	..	59.8	61.7	62.8	63.7	64.6	65.7
	4	2	6207.0	8.4	L	..	..	00.3	00.5	00.8	01.2	02.4	12.0	15.5	17.3	19.1	20.5	21.9	23.3
	5	21	6256.0	8.3	S	..	..	..	..	..	..	*55.1*	58.0	59.1	59.7	60.2	61.0	62.2	64.4
	6	26	6292.1	8.8	A	87.6	88.0	*88.5*	*88.9*	89.4	89.9	..	..	93.2	95.1	96.5	97.8	99.4	00.9
	7	26	6322.8	8.3	L	18.2	18.4	18.7	19.0	19.3	19.6	19.8	26.1	29.8	31.8	33.2	34.4	35.5	37.4
	9	11	6369.4	8.3	S	66.6	66.8	67.0	67.1	67.2	67.4	67.6	71.3	72.5	73.3	74.2	75.5	77.3	80.0
	10	15	6403.5	8.3	L	..	..	..	..	..	..	..	08.1	10.7	12.6	14.0	15.1	16.0	17.2
	11	21	6440.0	8.7	A	33.5	34.5	35.5	36.5	37.5	38.5	..	..	41.4	42.8	43.9	44.8	45.9	47.1
	12	28	6477.3	8.3	L	..	72.4	*72.6*	*72.8*	73.1	73.4	74.5	81.5	84.8	86.3	87.2	88.0	88.7	89.7
04	2	13	6524.6	..	S	..	..	..	..	23.5	..	..	..	27.5	28.2	29.1	30.1	31.2	32.5
	3	29	6569.6	8.3	L	..	..	*64.5*	*64.7*	*65.2*	*65.5*	*65.9*	*74.7*	..	..	..	..	..	..
	6	1	6633.6	8.3	S	30.7	31.0	31.2	31.4	31.6	31.8	32.2	35.8	37.8	39.3	40.5	41.6	42.7	43.8
	7	19	6681.0	8.3	L	*74.4*	*74.8*	75.3	75.7	76.2	76.7	77.5	86.2	89.0	90.4	91.7	92.9	94.3	95.8
	9	16	6740.5	8.2	S	..	..	..	..	..	..	..	43.3	44.6	45.4	46.0	46.5	46.9	47.5
	10	29	6783.3	8.4	L	78.5	78.7	78.8	79.0	79.2	*79.4*	*80.7*	86.6	90.7	92.6	93.8	94.8	95.7	97.2
05	1	11	6857.2	8.3	S	53.3	53.6	53.8	54.0	54.2	54.5	54.9	59.7	61.5	62.7	63.4	65.7	66.5	68.2
	5	2	6968.4	8.3	S	..	..	..	..	..	..	..	*70.2*	*72.3*	*73.2*	*73.6*	7.43	74.8	75.3
	6	9	7006.3	8.2	L	*00.9*	*01.1*	*01.3*	*01.6*	*01.9*	*02.2*	*02.9*	12.3	..	..	..	..	..	..
	7	31	7058.7	8.3	S	55.5	55.7	..	..	..	..	..	61.5	62.7	63.3	63.8	..	..	..
	9	13	7102.1	8.4	L	..	..	..	..	..	..	..	05.0	10.2	11.7	12.7	13.7	14.8	15.7
	10	26	7145.8	8.3	S	..	..	..	..	..	..	45.7	47.6	48.3	48.9	49.5	50.7	51.8	53.5
	11	26	7176.0	8.5	L	..	..	..	..	..	..	..	..	82.3	85.2	86.8	88.0	88.9	90.0
06	1	11	7222.6	8.3	S	..	..	..	..	..	*20.6*	*21.4*	*24.6*	*26.4*	*27.6*	28.1	28.5	28.9	29.5
	2	23	7265.8	8.2	L	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	3	28	7298.0	..	A	..	..	..	..	..	..	..	..	..	01.6	02.8	04.0	05.3	06.8
	4	30	7331.6	8.3	S	..	..	..	..	..	29.4	29.9	33.9	34.8	35.7	36.4	37.3	38.2	39.3
	6	7	7369.4	8.2	L	..	..	..	..	..	65.8	66.0	74.5	77.2	78.8	79.9	81.0	82.1	83.3
	7	19	7411.6	8.3	S	..	..	.	10.4	10.5	10.6	10.7	13.0	14.3	15.6	16.7	17.7	18.6	19.4
	8	31	7454.7	8.3	A	44.2	44.8	45.6	47.1	48.7	50.2	51.6	57.2	60.4	62.1	63.5	65.1	66.7	68.5
	10	25	7509.8	8.5	S	..	..	..	..	07.4	07.8	09.0	10.7	13.4	14.5	15.5	16.5	17.6	19.2
	12	3	7548.5	8.7	A	38.8	40.0	41.3	42.7	44.2	45.9	..	..	51.3	53.1	54.7	56.4	*58.4*	61.5
07	1	11	7587.2	8.4	S	...	..	..	85.2	85.5	85.8	86.2	..	..	..	..	..	..	..
	2	10	7617.7	8.4	L	14.1	14.5	14.7	15.1	15.3	15.6	16.2	19.4	*23.6*	*25.7*	27.2	28.3	29.3	30.4
	3	28	7663.9	..	S	..	..	..	..	..	..	..	..	66.3	68.3	*70.2*	..	..	..
	5	22	7717.1	9.0	A	*07.5*	*09.3*	*10.8*	..	..	15.5	..	..	17.7	19.3	20.4	21.8	..	..
	6	23	7750.0	8.4	L	..	..	..	..	..	..	46.9	54.0	57.1	58.6	59.7	61.2	62.4	63.8
	8	15	7803.7	8.1	S	99.0	99.8	00.4	01.0	01.4	01.7	02.1	07.5	08.3	09.0	09.7	10.3	10.9	*11.5*
	10	23	7872.2	8.4	L	67.5	67.7	68.0	68.2	68.5	68.7	69.1	72.4	79.6	81.8	83.0	84.1	85.2	86.2
	12	10	7920.4	8.5	S	..	..	..	17.2	17.5	17.7	20.0	20.4	24.4	25.8	27.2	28.2	29.5	30.8
08	1	29	7970.9	8.6	L	*64.9*	*65.3*	*65.8*	*66.2*	*66.6*	*67.2*	..	..	77.7	79.8	81.7	..	..	..
	3	11	8012.6	..	S	..	..	*10.5*	10.8	*11.1*	..	..	..	..	..	..	..	..	..
	4	8	8040.0	..	A	..	..	..	..	..	..	..	..	..	..	44.4	46.5	..	..
	5	11	8073.2	8.6	L	..	..	..	64.4	65.1	66.2	..	..	82.0	83.5	84.7	85.8	87.1	88.3
	7	23	8146.1	8.6	S	..	..	..	..	..	..	..	..	49.3	50.6	..	..	..	..

The maxima 3807.5, 5475.0, and 7265.8 have no other observations than those at full brightness, and are, therefore, deduced only by inspection. The methods used in deriving the other times of maxima are described on page 40.

The three typical light curves of this star, long, short, and anomalous, have been derived from the last fourteen columns of Table II, by subtracting the successive times in these columns. The differences give the times during which the light of the star changed by each half magnitude in each maximum, and the light curve is obtained by combining these means. The whole time during which the star has been under observation has been divided into five periods, and the last four have been used in deriving the mean light curves. It seemed best to make the divisions at the times of the anomalous maxima, since these break the continuity of the maxima, which between them are alternately long and short. Accordingly, the divisions were made near J. D. 2,413,800, 2,415,000, 2,416,150, and 2,417,300. The first period contains only photographic observations, insufficient in number to discuss in this way, and, accordingly, it has been omitted. These divisions have been made to determine whether any deviations existed between the individual mean curves, and the mean curves derived from all the observations.

Tables III, IV, and V, contain the results for the long, short, and anomalous maxima, respectively. The first column in each table gives the magnitude be-

TABLE III.

LONG MAXIMUM.

Magn.	Numbers.					Sums.					Means.					Curve.	Corr. Curve.	A. D.
	I.	II.	III.	IV.	All.	I.	II.	III.	IV.	All.	I.	II.	III.	IV.	All.			
11.5	8	7	5	2	22	1.7	2.0	2.3	0.6	6.6	0.21	0.29	0.46	0.30	0.30	0.00	0.00	.06
11.0	9	7	6	2	24	1.7	1.7	1.6	0.5	5.5	0.19	0.24	0.27	0.25	0.23	0.30	0.25	.03
10.5	9	7	7	2	25	1.9	2.1	2.3	0.6	6.9	0.21	0.30	0.33	0.30	0.28	0.53	0.49	.04
10.0	9	7	7	2	25	2.0	1.8	2.6	0.5	6.9	0.22	0.26	0.37	0.25	0.28	0.81	0.73	.05
9.5	9	8	7	2	26	2.1	1.9	3.0	0.5	7.5	0.23	0.24	0.43	0.25	0.29	1.09	0.98	.07
9.0	9	8	6	3	26	7.3	5.8	4.6	1.0	18.7	0.81	0.74	0.77	0.33	0.72	1.38	1.38	.14
8.5	9	10	6	4	29	63.9	73.4	38.3	22.1	197.7	7.10	7.34	6.38	5.52	6.82	2.10	1.98	.64
8.5	9	11	6	4	30	33.4	30.2	23.5	17.2	104.3	3.71	2.74	3.92	4.30	3.44	8.92	8.80	.58
9.0	9	11	6	4	30	16.0	16.9	13.3	7.4	53.6	1.78	1.54	2.22	1.85	1.79	12.36	12.24	.19
9.5	9	10	7	4	30	11.2	11.6	9.5	4.9	37.2	1.24	1.16	1.36	1.22	1.24	14.15	14.03	.06
10.0	9	10	7	4	30	9.2	9.6	7.8	4.8	31.4	1.02	0.96	1.11	1.20	1.05	15.39	15.33	.08
10.5	9	10	7	4	30	9.6	9.9	7.3	4.4	31.2	1.07	0.99	1.04	1.10	1.04	16.44	16.41	.04
11.0	9	10	7	4	30	12.2	11.4	9.3	4.7	37.6	1.36	1.14	1.33	1.18	1.25	17.48	17.47	.09
11.5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	18.73	18.69	..

TABLE IV.

SHORT MAXIMUM.

Magn.	Numbers.					Sums.					Means.					Curve.	Corr. Curve.	A. D.
	I.	II.	III.	IV.	All.	I.	II.	II.	IV.	All.	I.	II.	III.	IV.	All.			
11.5	9	4	3	1	17	2.1	1.1	0.8	0.8	4.8	0.23	0.28	0.27	0.80	0.28	0.00	0.00	.14
11.0	10	4	4	1	19	1.8	0.9	0.8	0.6	4.1	0.18	0.22	0.20	0.60	0.21	0.28	0.22	.11
10.5	9	4	3	1	18	1.6	0.7	0.5	0.6	3.4	0.18	0.18	0.17	0.60	0.19	0.49	0.42	.11
10.0	9	6	3	3	21	1.4	1.1	0.5	0.8	3.8	0.16	0.18	0.17	0.27	0.18	0.68	0.62	.03
9.5	9	6	3	4	22	1.8	1.2	0.7	1.1	4.8	0.20	0.20	0.23	0.27	0.22	0.86	0.82	.02
9.0	6	6	3	5	20	1.5	1.6	1.3	1.6	6.0	0.25	0.27	0.43	0.32	0.30	1.08	1.03	.06
8.5	7	7	5	4	23	16.4	18.4	16.1	13.4	64.3	2.34	2.63	3.22	3.35	2.80	1.38	1.31	.40
8.5	7	7	8	4	26	13.6	10.8	12.2	5.7	42.3	1.94	1.54	1.52	1.42	1.63	4.18	4.11	.18
9.0	9	7	9	5	30	12.1	7.5	7.9	6.0	33.5	1.34	1.07	0.88	1.20	1.12	5.81	5.74	.15
9.5	10	7	9	5	31	10.4	5.9	6.3	5.4	28.0	1.04	0.84	0.70	1.08	0.90	6.93	6.86	.14
10.0	10	7	8	4	29	9.7	6.5	7.2	3.5	26.9	0.97	0.93	0.90	0.88	0.93	7.83	7.77	.03
10.5	9	6	8	4	27	9.6	5.7	7.5	3.5	26.3	1.07	0.95	0.94	0.88	0.97	8.76	8.68	.06
11.0	8	6	8	4	26	8.5	6.3	10.3	4.1	29.2	1.06	1.05	1.29	1.02	1.12	9.73	9.64	*.10*
11.5	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. . .	. .	10.85	10.76	. .

TABLE V.

ANOMALOUS MAXIMUM.

Magn.	Numbers.					Sums.					Means.					Curve.	Corr. Curve	A. D.
	I.	II.	III.	IV.	All.	I.	II.	III.	IV.	All.	I.	II.	III.	IV.	All.			
11.5	1	2	3	3	9	0.4	3.3	2.6	3.6	9.9	0.40	1.65	0.87	1.20	1.10	0.00	0.00	.38
11.0	2	2	3	3	10	2.3	3.1	3.0	3.6	12.0	1.15	1.55	1.00	1.20	1.20	1.10	1.08	.17
10.5	2	2	3	2	9	2.3	3.0	2.7	1.9	9.9	1.15	1.50	0.90	0.95	1.10	2.30	2.24	.20
10.0	2	2	3	2	9	2.1	3.0	3.1	3.1	11.3	1.05	1.50	1.03	1.55	1.26	3.40	3.36	.24
9.5	2	2	3	2	9	2.5	3.0	3.3	3.2	12.0	1.25	1.50	1.10	1.60	1.33	4.66	4.70	.19
9.0	2	2	3	3	10	7.6	6.6	9.6	16.8	40.6	3.80	3.30	3.20	5.60	4.06	5.99	6.00	.86
9.0	2	2	3	3	10	3.1	2.9	5.2	5.1	16.3	1.55	1.45	1.73	1.70	1.63	10.05	10.00	.11
9.5	2	2	2	4	10	1.9	2.2	2.4	5.1	11.6	0.95	1.10	1.20	1.27	1.16	11.68	11.60	.11
10.0	2	2	2	4	10	2.1	2.1	1.9	5.9	12.0	1.05	1.05	0.95	1.48	1.20	12.84	12.80	.21
10.5	2	2	2	3	9	2.5	2.1	2.3	4.9	11.8	1.25	1.05	1.15	1.63	1.31	14.04	14.00	.20
11.0	1	2	2	3	8	2.1	2.2	2.3	6.4	13.0	2.10	1.10	1.15	2.13	1.62	15.35	15.35	.50
11.5	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	16.97	16.90	. .

tween which and the following magnitude, differences were taken. The second, third, fourth, and fifth columns give, respectively, the number of differences used in the four different periods, while the sixth column gives the total number used.

The next five columns give the sums for the four periods, and for all, while the twelfth to the sixteenth columns give the corresponding means. The seventeenth column gives the mean light curve found by adding the successive values contained in the sixteenth column. The ordinates of a smooth curve are given in the eighteenth column. The nineteenth column contains the average deviation, in days, of each period from the means given in the sixteenth column.

The light curves derived from Table III, IV, and V, are shown graphically in Figures 5, 6, and 7, of Plate I, and are derived from the first and eighteenth columns of those tables. Corresponding results derived from the four periods separately are shown in the same Figures, lowering the points by one centimetre, which is equal to one magnitude. No appreciable difference appears in these periods, except for the anomalous maxima, which are broader in the last of the four periods, than in the other three. This is also shown in the fifteenth column of Table V. In all the figures in Plate I, long maxima are indicated by dots, short maxima by circles, and anomalous maxima by crosses.

From an examination of the last column of each of the three preceding tables, it will be seen that the average deviations of the measured points on the three forms of light curves are $\pm 0^d.16$, $\pm 0^d.12$ and $\pm 0^d.29$, for the long, short, and anomalous maxima, respectively. The greater part of the discordance appears in each case to be due to the readings at maximum brightness, when the light changes slowly. Omitting these values, the average deviations become $\pm 0^d.08$, $\pm 0^d.09$ and $\pm 0^d.23$, respectively.

The mean values of the magnitudes at different maxima are found from the third column of Table II. For the long maxima, they are 8.37, 8.28, 8.33, and 8.35, for the four parts of the entire period, respectively; for the short maxima, they are 8.41, 8.36, 8.29 and 8.40; for the anomalous maxima, they are 8.77, 8.70, 8.75, and 8.67. No systematic change is indicated, and the mean values for each form of maximum, 8.33, 8.35 and 8.72, may be assumed for the entire period. The magnitude of this star when faint seems to fluctuate, and will be discussed later. Assuming the mean value, 11.8, and prolonging the curve, derived from the eighteenth column of the three preceding tables, to this magnitude, the approximate time occupied by each form of maximum can be determined. The result for the long maximum is $19^d.7$, for the short, $11^d.6$, and for the anomalous, $18^d.6$.

The magnitudes for intervals of a day, while the star is brighter than the minimum magnitude, are given in Table VI, for each form of maximum. The first column gives the number of days after the light begins to increase, the second, fourth and sixth columns give the corresponding magnitudes for the three forms, respectively, while the third, fifth and seventh columns give the corresponding first differences of these magnitudes. Negative values are indicated by Italics.

TABLE VI.

MAGNITUDES AT INTERVALS OF ONE DAY.

Days.	Long Max.		Short Max.		Anom. Max.		Days.	Long Max.		Short Max.		Anom. Max.	
	Magn.	Diff.	Magn.	Diff.	Magn.	Diff.		Magn.	Diff.	Magn.	Diff.	Magn.	Diff.
0.0	11.8	*2.0*	11.8	*2.4*	11.8	*0.5*	11.0	8.7	0.2	11.5	0.3	9.1	0.3
1.0	9.8	*1.2*	9.4	*1.0*	11.3	*0.5*	12.0	8.9	0.2	11.8	..	9.4	0.4
2.0	8.6	0.2	8.4	*0.1*	10.8	*0.4*	13.0	9.1	0.3	..	..	9.8	0.4
3.0	8.4	*0.1*	8.3	0.1	10.4	*0.4*	14.0	9.4	0.4	..	..	10.2	0.5
4.0	8.3	0.0	8.4	0.3	10.0	*0.4*	15.0	9.8	0.4	..	..	10.7	0.3
5.0	8.3	0.0	8.7	0.3	9.6	*0.4*	16.0	10.2	0.5	..	..	11.0	0.4
6.0	8.3	0.0	9.0	0.4	9.2	*0.4*	17.0	10.7	0.4	..	..	11.4	0.4
7.0	8.3	0.0	9.4	0.6	8.8	*0.1*	18.0	11.1	0.4	..	..	11.8	..
8.0	8.4	0.1	10.0	0.6	8.7	0.0	19.0	11.5	0.3	..	..	..	..
9.0	8.5	0.1	10.6	0.5	8.7	0.2	20.0	11.8	..	..	..	..	..
10.0	8.6	0.1	11.1	0.4	8.9	0.2							

It appears from Table VI that, on the first day of the long maximum, the increase in light is 2.0 magn. The corresponding increase for the short maximum is 2.4 magns., while the greatest change during the anomalous maximum is 0.5 magn.

Table VII furnishes the means of determining the times of maxima from the mean light curves. The magnitude is given in the first column, and the corresponding interval in days is given in the second column. The time when the light begins to increase is taken as an origin. At this time the magnitude is assumed to be 11.8. The values, therefore, will differ systematically from those given in the last columns but one of Table III, IV, and V, in which the origin is the time at which the magnitude was 11.5. The mean of the times of increase and decrease when the star attains the same magnitude is given in the third column. The difference in these times is given in the fourth column. Extending the curve indicated by the numbers in the first and third columns to the mean maximum, magnitude 8.33, we find the corresponding mean interval, $5^d.10$. Subtracting the values contained in the second column from 5.10 gives the values in the fifth column, Italics indicating time before maximum. This

TABLE VII.

MEAN LIGHT CURVES FOR COMPUTING TIMES OF MAXIMA.

Magn.	Long Max.			Diff. Max.	Short Max.			Diff. Max.	Anom. Max.			Diff. Max.
	Curve.	Mean.	Diff.		Curve.	Mean.	Diff.		Curve.	Mean.	Diff.	
11.5	0.25	9.60	18.69	*4.85*	0.20	5.58	10.76	*2.45*	0.60	9.05	16.90	*8.05*
11.0	0.50	9.11	17.22	*4.60*	0.42	5.13	9.42	*2.23*	1.68	8.82	14.27	*6.97*
10.5	0.74	8.70	15.92	*4.36*	0.62	4.75	8.26	*2.03*	2.84	8.72	11.76	*5.81*
10.0	0.98	8.28	14.60	*4.12*	0.82	4.40	7.15	*1.83*	3.95	8.68	9.45	*4.70*
9.5	1.23	7.76	13.05	*3.87*	1.02	4.04	6.04	*1.63*	5.30	8.75	6.90	*3.35*
9.0	1.55	7.02	10.94	*3.55*	1.23	3.58	4.71	*1.42*	6.60	8.60	4.00	*2.05*
8.5	2.23	5.64	6.82	*2.87*	1.51	2.91	2.80	*1.14*	. .	. .	. .	. .
8.5	9.05	. .	. .	3.95	4.31	. .	. .	1.66	. .	. .	. .	. .
9.0	12.49	. .	. .	7.39	5.94	. .	. .	3.29	10.60	. .	. .	1.95
9.5	14.28	. .	. .	9.18	7.06	. .	. .	4.41	12.20	. .	. .	3.55
10.0	15.58	. .	. .	10.48	7.97	. .	. .	5.32	13.40	. .	. .	4.75
10.5	16.66	. .	. .	11.56	8.88	. .	. .	6.23	14.60	. .	. .	5.95
11.0	17.72	. .	. .	12.62	9.84	. .	. .	7.19	15.95	. .	. .	7.30
11.5	18.94	. .	. .	13.84	10.96		. .	8.31	17.50	. .	. .	8.85

last column serves to determine the time of maximum corresponding to any observed magnitude. Thus, if the star, at a given time, was of the magnitude 10.0, and its light was increasing, the maximum would occur 4^d.12 later, and if it were decreasing, 10^d.48 earlier. The next four columns give the corresponding quantities for a short maximum, the interval corresponding to the mean magnitude 8.35, being 2^d.65. The last four columns of the table give similar results for the anomalous maxima, the interval corresponding to the mean magnitude, 8.72, being 8^d.65. The adopted times of maxima were found by the aid of Table VII. It furnished a correction to each time given in the fifth to the eighteenth column inclusive, of Table II. The mean of all these values was taken for each maximum. A second determination was made graphically. The lines connecting the two points when the magnitudes were the same, and the light was increasing and decreasing, were bisected. A curve drawn through these bisections, extended to the maximum magnitude, gave the required time. The two methods are compared in Table VIII. The first column gives the time of maximum derived from the mean light curve. The second column gives the difference found by subtracting the times of maxima derived from the observations when the light was increasing from that when it was decreasing. The third and fourth column gives the average deviation in the two cases. The fifth column gives the time deduced by the method of bisections. The means of the two methods are given in the sixth column, and are those entered in the second column of Table II. The difference between the results found by these two methods is shown in the last column, Italics denoting that the value from the second method is the greater. The average deviations of the values in the second column are $\pm 1^d.00$, $\pm 1^d.70$, and $\pm 3^d.35$, for the long, short, and anomalous maxima, respectively. The means of the average deviations given in the third column are $\pm 0^d.17$, $\pm 0^d.13$, and $\pm 0^d.53$, respectively, of those in the fourth column, $\pm 0^d.37$, $\pm 0^d.40$, and $\pm 0^d.31$. The mean of each of the three columns regardless of the form of variation is $\pm 1^d.40$, $\pm 0^d.20$, and $\pm 0^d.38$, respectively. This seems to show that the increasing side of the long and short maxima is more uniform than the decreasing side, while the opposite is the case with the anomalous maxima. The average deviation of the difference between the two methods of the deductions of the maxima is $\pm 0^d.42$, $\pm 0^d.45$, and $\pm 0^d.73$, respectively, and the mean of all, $\pm 0^d.48$. The maxima 3807.5, 5475.0, and 7265.8, respectively, are those which were determined only by inspection as noted on page 37.

TABLE VIII.

TIMES OF MAXIMA.

Method I				Method II	Mean Max.	Diff.	Method I				Method II	Mean Max.	Diff.
J. D.	D–I	A. D. Dec.	A. D. Inc.	J. D.	J. D.	I–II	J. D.	D–I	A. D. Dec.	A. D. Inc.	J. D	J. D.	I–II
1630.4	*3.8*	0.1	0.0	1632.0	1631.2	*1.6*	4261.4	*0.2*	0.2	0.5	4261.0	4261.2	0.4
1674.6	*2.9*	A	A	1675.6	1675.1	*1.0*	4311.4	*0.1*	0.1	0.2	4311.5	4311.4	*0.1*
1956.8	. .	. .	0.0	. . .	1956.8	. .	4372.4	*0.9*	0.0	0.1	4372.0	4372.2	0.4
2038.9	. .	0.4	. .	. . .	2038.9	. .	4432.0	*0.4*	0.0	0.3	4432.1	4432.0	*0.1*
2079.3	*0.1*	0.1	0.4	2079.3	2079.3	0.0	4492.7	0.6	0.1	0.2	4492.5	4492.6	0.2
2754.4	*1.1*	A	A	2754.6	2754.5	*0.2*	4541.8	0.3	0.0	0.2	4542.0	4541.9	0.2
3048.7	. .	. .	0.8	. . .	3048.7	. .	4606.3	1.0	0.1	0.2	4606.4	4606.4	*0.1*
3539.3	. .	.01	.	. . .	3539.3	. .	4665.8	*0.1*	0.1	0.5	4665.6	4665.7	0.2
. . .	. .	. .	. .	. . .	3807.5	R	4722.7	1.3	0.1	0.8	4722.8	4722.8	*0.1*
3846.4	*2.2*	0.0	0.2	3847.2	3846.8	*0.8*	4780.7	0.0	0.1	0.5	4780.8	4780.8	*0.1*
3884.8	*1.5*	0.6	0.1	3885.4	3885.1	*0.6*	4840.8	*2.3*	0.1	0.6	4840.3	4840.6	0.5
3942.6	*2.9*	0.3	1.0	3942.7	3942.6	*0.1*	4984.0	*0.3*	0.2	0.5	4984.3	4894.2	*0.3*
4006.6	*0.6*	0.1	0.2	4006.5	4006.6	0.1	4955.0	*0.2*	0.0	0.7	4954.7	4954.8	0.3
4042.3	3.3	0.9	0.4	4042.0	4042.2	0.3	4989.7	*0.2*	1.0	0.2	4990.7	4990.2	*1.0*
4083.6	*0.6*	0.1	0.2	4084.1	4083.8	*0.5*	5024.8	0.2	0.1	0.0	5025.7	5025.2	*0.9*
4147.5	*1.0*	0.1	0.4	4174.1	4147.3	0.4	5086.5	2.2	0.1	0.6	5087.8	5087.1	*0.3*
4200.0	0.2	0.1	0.3	4200.3	4200.2	*0.3*	5137.1	0.6	0.1	0.1	5137.3	5137.2	*0.2*

Method I				Method II	Mean Max.	Diff.	Method I				Method II	Mean Max.	Diff.
J. D.	D–I	A. D. Dec.	A. D. Inc.	J. D.	J. D.	I–II	J. D.	D–I	A. D. Dec.	A. D. Inc.	J. D.	J. D.	I–II
5204.8	*1.1*	0.1	0.1	5205.3	5205.0	*0.5*	6740.5	. .	. .	0.7	. . .	6740.5	. .
5317.3	13.2	0.1	0.2	5317.5	5317.4	*0.2*	6783.2	0.1	0.1	0.2	6783.4	6783.3	*0.2*
5333.8	*0.8*	A	0.3	5334.0	5333.9	*0.2*	6857.4	*2.9*	0.1	0.7	6857.0	6857.2	0.4
5378.2	1.3	0.0	0.3	5378.3	5378.2	*0.1*	6968.4	. .	. .	0.7	. . .	6968.4	. .
5420.4	0.8	A	0.5	5421.5	5421.0	*1.1*	7006.1	*2.6*	0.0	A	7006.5	7006.3	*0.4*
. . .	. .	. .	. .	. . .	5475.0	R	7058.7	1.3	0.0	0.4	. . .	7058.7	. .
5516.8	0.5	0.2	0.6	5517.6	5517.2	*0.8*	7102.1	. .	. .	0.4	. . .	7102.1	. .
5574.7	0.4	0.0	0.1	5574.5	5574.6	0.2	7145.1	1.9	A	0.5	7146.4	7145.8	*1.3*
5619.2	1.5	0.1	0.5	5620.1	5619.6	*0.9*	7176.0	. .	. .	0.4	. . .	7176.0	. .
5674.2	*0.2*	0.0	0.2	5674.1	5674.2	0.1	7222.4	0.3	0.2	0.6	7222.7	7222.6	*0.3*
5726.7	0.4	0.3	0.1	5726.8	5726.8	*0.1*	. . .	. .	. .	. .	. . .	7256.8	R
5785.9	0.4	A	0.2	5785.4	5785.6	0.5	7298.0	. .	. .	0.0	. . .	7298.0	. .
5845.7	. .	. .	0.3	. . .	5845.7	. .	7331.2	0.7	0.1	0.4	7332.1	7331.6	*0.9*
5890.0	1.2	0.2	0.5	5890.5	5890.2	*0.5*	7369.6	0.5	0.2	0.3	7369.2	7369.4	0.4
5950.3	0.4	0.1	0.4	5950.8	5950.6	*0.5*	7411.5	0.7	0.1	0.1	7411.6	7411.6	*0.1*
6001.2	1.4	0.1	0.8	6001.8	6001.5	*0.6*	7455.5	*7.0*	0.3	0.4	7453.9	7454.7	1.6
6064.2	*0.5*	0.3	0.2	6063.5	6063.8	0.7	7509.9	*0.3*	0.6	0.4	7509.8	7509.8	0.1
6114.1	*1.5*	0.0	0.1	6114.0	6114.0	0.1	7549.0	3.3	0.4	0.9	7548.1	7548.5	0.9
6157.7	0.0	0.5	0.4	6158.2	6158.0	*0.5*	7587.2	. .	0.1	. .	. . .	7587.2	. .
6207.0	*3.8*	0.2	0.5	6207.1	6207.0	*0.1*	7617.8	2.7	0.1	0.3	7617.6	7617.7	0.2
6255.6	0.7	A	0.5	6265.3	6256.0	*0.7*	7663.9	. .	. .	0.6	. . .	7663.9	. .
6292.8	2.1	1.1	0.2	6291.4	6292.1	1.2	7716.1	0.8	0.6	0.1	7716.6	7716.4	*0.5*
6322.8	0.3	1.1	0.3	6322.8	6322.8	0.0	7749.7	0.1	A	0.2	7750.4	7750.0	*0.7*
6369.3	0.8	0.1	0.8	6369.4	6369.4	*0.1*	7803.5	*1.8*	0.5	0.6	7804.1	7803.8	*0.6*
6403.5	. .	. .	0.2	. . .	6403.5	. .	7872.1	1.2	0.4	1.0	7872.2	7872.2	*0.1*
6440.0	2.2	0.2	0.4	6440.0	6440.0	0.0	7920.7	*1.8*	0.8	0.9	7920.1	7920.4	0.6
6476.8	0.3	0.1	0.5	6477.8	6477.3	*1.0*	7970.4	*0.5*	0.3	0.3	7971.4	7970.9	*1.0*
6524.1	1.1	A	0.2	6526.0	6524.6	*0.9*	8012.6	. .	0.1	. .	. . .	8012.6	. .
6569.2	1.8	0.1	A	6570.0	6569.6	*0.8*	8040.0	. .	. .	0.3	. . .	8040.0	. .
6634.1	*1.8*	0.6	0.4	6633.1	6633.6	1.0	8072.6	*5.3*	0.5	0.2	8073.7	8073.2	*1.1*
6680.7	*1.5*	0.4	0.3	6681.3	6681.0	*0.6*	8146.1	. .	. .	0.1	. . .	8146.1	. .

A discussion of the times of maximum given in the sixth column of Table VIII is contained in Table IX. These times are given in the first column, and their first differences in the second. The time at which the star attained the magnitude 10.0, when the light was increasing, is given in the third column, and is taken from the eighth column of Table II, disregarding the Italics. To render this column more complete, additional values are inserted in Italics, and were obtained by applying to the first column the correction derived from the mean light curve. For this purpose, the values $4^d.1$, $1^d.8$, and $4^d.5$, were subtracted for the long, short, and anomalous maxima, respectively. The corresponding first differences are given in the fourth column. The time at which the star attained the magnitude 10.0, when the light was decreasing, is given in the fifth column. The values $10^d.5$ and $5^d.3$ were added, when wanting, for the long and short maxima, respectively. Their first differences are given in the sixth column. The number in the fifth column minus that in the third is given in the seventh column, and indicates the breadth of the maximum. The number in the third column minus that preceding it in the fifth column is given in the eighth column. The time of maximum computed by the formula J. D. 2,400,000 + $103^d.6$ E is given in the ninth column, and the corresponding value of E in the tenth. The period, $103^d.6$, is found as described on page 47. The observed minus the computed times of maxima are given in the eleventh column, and are found by subtracting the numbers given in the ninth column, from those in the first. A corrected value for the short maxima is given in the twelfth column, and is found by subtracting $54^d.8$, the mean interval from the long to the short maxima, from the values in the eleventh corresponding to the short maxima.

TABLE IX.

DISCUSSION OF TIMES OF MAXIMA.

Obs. Max.	Diff.	10.0 I	Diff.	10.0 D	Diff.	D–I	I–D	Comp.	Ep.	O–C	Corr. O–C
1631.2	43.9	1630.5	40.5	1633.7	51.9	3.2	37.3	1554.0	15	77.2	22.4
1675.1	281.7	*1671.0*	281.7	*1685.6*	281.7	14.6	..	1657.6	16	17.5	..
1956.8	82.1	*1952.7*	82.1	1967.3	82.1	14.6	..	1968.4	19	*11.8*	..
2038.9	40.4	*2034.8*	42.7	*2049.4*	35.0	14.6	28.1	2072.0	20	*33.1*	..
2079.3	675.2	*2077.5*	672.9	2084.4	680.6	6.9	..	2072.0	20	7.3	*47.5*
2754.5	294.2	*2750.4*	294.2	*2765.0*	294.3	14.6	..	2797.2	27	*42.7*	..
3048.7	490.6	*3044.6*	493.0	3059.3	485.3	14.7	..	3108.0	30	*59.3*	..
3539.3	268.2	3537.6	265.4	*3544.6*	273.4	7.0	..	*3522.4*	34	16.9	*37.9*
3807.5	39.3	*3803.4*	40.2	*3818.0*	34.7	*14.6*	25.6	3833.2	37	*25.7*	..
3846.8	38.2	3843.6	35.9	3852.7	37.8	9.1	26.8	3833.2	37	13.6	*41.2*
3885.0	57.6	3879.5	57.2	3890.5	63.8	11.0	46.2	3936.8	38	*51.8*	..
3942.6	64.0	3936.7	68.1	3954.3	57.8	17.6	50.5	3936.8	38	5.8	..
4006.6	35.5	*4004.8*	34.2	4012.1	43.1	7.3	26.9	3936.8	38	69.8	15.0
4042.1	41.7	4039.0	40.1	4045.2	49.0	6.2	33.9	4040.4	39	1.7	..
4083.8	63.5	4079.1	66.1	4049.2	59.3	15.1	51.0	4040.4	39	43.4	..
4147.3	52.9	4145.2	50.8	4153.5	57.0	8.3	42.5	4040.4	39	106.9	52.1
4200.2	61.0	4196.0	63.5	4210.5	56.6	14.5	49.0	4144.0	40	56.2	..
4261.2	50.2	4259.5	47.7	4267.1	55.2	7.6	40.1	4144.0	40	117.2	62.4
4311.4	60.8	4307.2	62.9	4322.3	55.7	15.1	47.8	4247.6	41	63.8	..

Obs. Max.	Diff.	10.0, I	Diff.	10.0, D	Diff.	D–I	I–D	Comp.	Ep.	O–C	Corr. O–C
4372.2	59.8	4370.1	57.8	4378.0	64.9	7.9	49.9	4247.6	41	124.6	69.8
4432.0	60.6	4427.9	63.3	4442.9	55.0	15.0	48.3	4351.2	42	80.8	..
4492.6	49.3	4491.2	46.6	4497.9	54.2	6.7	39.9	4351.2	42	141.4	86.6
4541.9	64.5	4537.8	67.2	4552.1	59.1	14.3	52.9	4454.8	43	87.1	..
4606.4	59.3	4605.0	56.7	4611.2	65.2	6.2	60.5	4454.8	43	151.6	96.8
4665.7	57.1	4661.7	59.8	4676.4	50.5	14.7	45.1	4558.4	44	107.3	..
4722.8	58.0	4721.5	55.1	4726.9	64.0	5.4	49.7	4558.4	44	164.4	109.6
4780.8	59.8	4776.6	61.3	4790.9	56.3	14.3	47.0	4662.0	45	118.8	..
4840.6	53.6	4837.9	51.8	4847.2	57.4	9.3	43.5	4662.0	45	178.6	123.8
4894.2	60.6	4889.7	63.4	4904.6	56.3	14.9	48.5	4765.6	46	128.6	..
4954.8	35.3	4953.1	32.2	4960.9	33.9	7.8	24.4	4765.6	46	189.2	134.4
4990.1	35.1	4985.3	35.4	4994.8	40.9	9.5	25.9	4869.2	47	120.9	..
5025.2	61.9	5020.7	62.3	*5035.7*	60.3	15.0	47.3	4869.2	47	156.0	..
5087.1	50.1	5083.0	52.6	5096.0	46.0	13.0	39.6	4972.8	48	114.3	..
5137.2	67.8	5135.6	64.6	5142.0	73.9	6.4	58.2	4972.8	48	164.4	109.6
5205.0	112.4	5200.2	..	5215.9	..	15.7	..	5076.4	49	128.6	..
5317.4	16.5	...	..	...	..	..	..	5180.0	50	137.4	..
5333.9	44.3	*5329.8*	47.2	5344.5	37.9	14.7	32.5	5180.0	50	153.9	..
5378.2	42.8	5377.0	39.9	5382.4	48.6	5.4	34.5	5180.0	50	198.2	143.4
5421.0	54.0	*5416.9*	56.3	5431.0	49.3	14.1	42.2	5283.6	51	137.4	..
5475.0	42.2	*5473.2*	39.8	*5480.3*	46.7	7.1	32.7	5283.6	51	191.4	136.6
5517.2	57.4	5513.0	60.1	5527.0	52.8	14.0	46.1	5387.2	52	130.0	..
5574.6	45.0	5573.1	42.8	5579.8	48.7	6.7	36.1	5387.2	52	187.4	132.6
5619.6	54.6	5615.9	56.4	5628.5	51.5	12.6	43.8	5490.8	53	128.8	..
5674.2	52.6	5672.3	50.4	5680.0	57.1	7.7	42.7	5490.8	53	183.4	128.6
5726.8	58.8	*5722.7*	61.1	5737.1	54.3	14.4	46.7	5594.4	54	132.4	..
5785.6	60.1	*5783.8*	57.8	5791.4	64.4	7.6	50.2	5594.4	54	191.2	136.4
5845.7	44.5	*5841.6*	44.6	5855.8	38.6	14.2	30.4	5698.0	55	147.7	..
5890.2	60.4	5886.2	60.3	5894.4	65.7	8.2	52.1	5698.0	55	192.2	..
5950.6	50.9	5946.5	53.6	5960.1	45.0	13.6	40.0	5801.6	56	149.0	..
6001.5	62.3	6000.1	59.9	6005.1	70.0	5.0	54.9	5801.6	56	199.9	145.1
6063.8	50.2	6060.0	51.3	6075.1	44.9	15.1	36.2	5905.2	57	158.6	..
6114.0	43.8	6111.3	41.7	6120.0	42.8	8.7	33.0	5905.2	57	208.8	154.0
6157.8	49.2	6153.0	47.5	6162.8	56.3	9.8	37.7	6008.8	58	149.0	..
6207.0	49.0	6200.5	53.7	6219.1	41.1	18.6	35.1	6008.8	58	198.2	..
6256.0	36.0	*6254.2*	34.7	6260.2	36.3	6.0	28.7	6008.8	58	247.2	192.4
6292.0	30.8	6288.9	30.1	6296.5	36.7	7.6	22.5	6008.8	58	183.2	..
6322.8	46.6	6319.0	48.1	6333.2	41.0	14.2	33.9	6112.4	59	210.4	..
6369.4	34.1	6367.1	32.3	6374.2	39.8	7.1	25.2	6112.4	59	257.0	202.2
6403.5	36.5	*6399.4*	37.1	6414.0	29.9	14.6	22.5	6216.0	60	187.5	..
6440.0	37.3	6436.5	36.3	6443.9	43.3	7.4	28.9	6216.0	60	224.0	..
6477.3	47.3	6472.8	50.0	6487.2	41.9	14.4	35.6	6319.6	61	157.7	..
6524.6	45.0	*6522.8*	41.9	6529.1	51.0	6.3	35.6	6319.6	61	205.0	150.2
6569.6	64.0	6564.7	66.7	*6580.1*	60.4	15.4	51.3	6423.2	62	146.4	..
6633.6	47.4	6631.4	44.3	6640.5	51.2	9.1	35.2	6423.2	62	210.4	155.6

Obs. Max.	Diff.	10.0. I	Diff.	10.0. D	Diff.	D–I	I–D	Comp.	Ep.	O–C	Corr. O–C
6681.0	59.5	6675.7	63.0	6691.7	54.3	16.0	47.0	6526.8	63	155.2	. .
6740.5	42.8	*6738.7*	40.3	6764.0	47.8	7.3	33.0	6526.8	63	213.7	158.9
6783.3	73.9	6779.0	75.0	6793.8	69.6	14.8	60.2	6630.4	64	152.9	. .
6857.2	111.2	6854.0	112.6	6863.4	110.4	9.4	. .	6630.4	64	226.8	172.0
6968.4	37.9	*6966.6*	35.0	6973.8	43.0	7.2	27.8	6734.0	65	234.4	179.6
7006.3	52.4	7001.6	55.3	*7016.8*	47.0	15.2	40.1	6837.6	66	168.7	. .
7058.7	43.4	*7056.9*	41.1	7063.8	48.9	6.9	34.2	6837.6	66	221.1	166.3
7102.1	43.7	*7098.0*	46.0	7112.7	36.8	14.7	31.3	6941.2	67	160.9	. .
7145.8	30.2	*7144.0*	27.9	7149.5	37.3	5.5	22.4	6941.2	67	204.6	149.8
7176.0	46.6	*7171.9*	48.9	7186.8	41.3	14.9	34.0	7044.8	68	131.2	. .
7222.6	43.2	*7220.8*	40.9	7228.1	48.2	7.3	33.6	7044.8	68	177.8	123.0
7265.8	32.1	*7261.7*	31.7	*7276.3*	26.5	14.6	17.1	7148.4	69	117.4	. .
7297.9	33.7	*7293.4*	36.4	7302.8	33.6	9.4	27.0	7148.4	69	149.5	. .
7331.6	37.8	*7329.8*	35.5	7336.4	43.5	6.6	28.9	7148.4	69	183.2	128.4
7369.4	42.2	*7365.3*	45.1	7377.9	36.8	14.6	30.5	7252.0	70	117.4	. .
7411.6	43.0	7410.4	36.7	7416.7	46.8	6.3	30.4	7252.0	70	159.6	104.8
7454.6	55.2	7447.1	60.9	7463.5	52.0	16.4	44.5	7355.6	71	99.0	. .
7509.8	38.6	*7508.0*	34.7	7515.5	39.2	7.5	27.2	7355.6	71	154.2	99.4
7548.4	38.8	7542.7	42.5	7554.7	37.8	12.0	30.5	7459.2	72	89.2	. .
7587.2	30.5	7585.2	29.9	*7592.5*	34.7	7.3	22.6	7459.2	72	128.0	73.2
7617.7	46.2	7615.1	47.0	7627.2	43.0	12.1	34.9	7562.8	73	54.9	. .
7663.9	53.2	*7662.1*	50.5	7670.2	50.2	8.1	42.4	7562.8	73	101.1	46.3
7717.1	32.9	*7712.6*	33.3	7720.4	39.3	7.8	25.5	7666.4	74	50.7	. .
7750.0	53.8	*7754.9*	55.1	7759.7	50.0	13.8	50.3	7666.4	74	85.6	. .
7803.8	68.4	7801.0	67.2	7809.7	73.3	8.7	58.5	7666.4	74	137.4	82.6
7872.2	. .	7868.2	. .	7883.0	. .	14.8	. .	7770.0	75	102.2	. .
7920.4	50.5	7917.2	49.0	7927.2	54.5	10.0	39.0	7770.0	75	150.4	95.6
7970.9	41.7	7966.2	44.6	7981.7	36.2	15.5	29.1	7873.6	76	97.3	. .
8012.6	27.4	8010.8	24.5	*8017.9*	26.5	7.1	17.4	7873.6	76	139.0	84.2
8040.0	33.2	*8035.3*	29.1	8044.4	40.3	9.1	20.0	7873.6	76	166.4	. .
8073.2	72.9	8064.4	79.9	8084.7	66.7	20.3	59.6	7977.2	77	96.0	. .
8146.1	. .	*8144.3*	. .	*8151.4*	. .	7.1	. .	7977.2	77	168.9	114.1

The intervals between the successive maxima given in the second column of Table IX are represented graphically in Figure 2. The breadths of the long and short maxima, taken from the seventh column of Table I, are similarly shown in Figure 3. The difference between the two kinds of maxima is thus shown in a marked measure. The magnitudes of the various maxima are represented in Figure 4. No special variations appear, except that the star is generally fainter at the time of the anomalous maxima, than at either the long or short maxima.

The deviations of the observed times of maximum from that computed by the formula, J. D. 2,410,000.0 + 103.6 E, indicated in the last two columns of Table IX, are shown in Plate I, Figure 1. Any of the points in Figure 1 may be raised or lowered by $103^d.6$, or a multiple of this period, by changing the assumed value of E, provided this does not give the same value of E for two different maxima. Accordingly, the points preceding J. D. 3500 are somewhat uncertain. It does not seem probable that any later points can be altered in this way. The variations appear to be due to real changes in the period of the star, and to be closely connected with the anomalous maxima. Thus, from J. D. 4000 to 5000 the intervals between the maxima are very nearly 114^d, as is also shown in Table X. The period then appears to have shortened continuously until about J. D. 7500, when it scarcely exceeded 80^d. The period at that time underwent a sudden increase to 100^d or more.

Table X contains the mean values of the intervals of the successive maxima for the last four periods described on page 37. The limits of each period, in Julian Days, are given in the first column. The intervals from the long to the following short, and from the short to the following long maxima, and the sum of these intervals are given in the second, third, and fourth columns. The next six columns give the corresponding intervals using, instead of the maxima, the times at which the star was of the magnitude 10.0, when it was increasing and when it was decreasing in light. The means of the results of the four periods are given in the last line of the table. The mean of the three values thus found of the period of this star, $103^d.5$, $103^d.8$, and $103^d.6$, is $103^d.6$, which is the value used in the formula given above.

TABLE X.

INTERVALS BETWEEN MAXIMA.

J. D.	Maximum.			10.0, Increase.			10.0, Decrease.		
	L–S	S–L	Sum.	L–S	S–L	Sum.	L–S	S–L	Sum.
3800–5000	59.1	54.7	113.8	61.6	52.4	114.0	54.1	59.7	113.8
5000–6150	53.1	53.3	106.4	55.3	52.2	107.5	48.4	58.7	107.1
6150–7300	53.7	40.5	94.2	56.3	38.0	94.3	48.2	45.9	94.1
7300–7900	47.4	45.6	93.0	49.1	44.2	93.3	43.3	50.5	93.8
Mean	54.8	48.7	103.5	57.1	46.7	103.8	49.8	53.8	103.6

It appears from the second and third columns of Table X, that the interval from the long to the short maxima exceeds that from the short to the long. The difference is still greater between the fifth and sixth columns, and the effect is reversed in the eighth and ninth columns. This was to be expected, owing to the difference in breadth of the two forms of maxima.

The variations in light, when the star is faint, are discussed in Table XI. The observations are grouped for intervals of five days, and the successive columns give the first Julian Day of each group, the number of observations, and the mean of the magnitudes.

TABLE XI.

DISCUSSION OF MAGNITUDE AT MINIMUM.

J. D.	No.	Mean.	J. D.	No.	Mean.	J. D.	No.	Mean.	J. D.	No.	Mean.
1690	3	11.73	3965	10	11.44	4185	27	11.93	4415	3	11.95
1720	4	12.15	3970	..	..	4215	13	11.68	4420	4	11.90
1745	2	12.10	3975	2	11.06	4220	19	11.79	4450	3	11.90
1940	1	12.20	3980	7	11.61	4225	14	11.81	4455	10	11.92
2000	2	11.40	3985	1	10.76	4230	16	11.82	4460	12	11.94
2350	4	11.62	3990	5	11.54	4235	18	11.60	4465	6	11.91
2360	2	11.60	3995	3	11.47	4240	8	11.78	4470	6	11.94
2370	3	11.60	4015	3	11.80	4245	20	11.81	4475	12	11.97
2395	3	11.43	4020	2	11.95	4250	17	11.89	4480	7	11.93
2660	2	11.65	4025	5	11.60	4275	11	11.85	4485	13	11.99
2700	3	11.67	4030	8	11.54	4280	9	11.81	4505	3	11.93
3025	2	11.60	4050	6	11.69	4285	6	11.91	4510	1	11.96
3435	4	11.52	4055	..	..	4290	2	11.95	4515	3	11.90
3440	2	11.65	4060	10	11.43	4295	5	11.89	4520	8	11.95
3725	4	11.52	4065	3	11.59	4300	2	11.55	4525	6	11.95
3825	10	11.45	4070	6	11.44	4325	1	11.94	4530	..	..
3830	2	11.55	4100	9	11.64	4330	1	11.40	4560	..	..
3855	6	11.26	4105	9	11.66	4335	4	11.90	4565	4	11.90
3860	5	11.47	4110	9	11.64	4340	1	11.94	4570	4	11.92
3865	4	11.30	4115	5	11.61	4345	8	11.90	4575	5	11.82
3870	10	11.42	4120	12	11.78	4350	6	11.83	4580	3	11.95
3895	8	11.21	4125	11	11.81	4355	5	11.88	4585	..	..
3900	10	11.37	4130	9	11.83	4360	7	11.85	4590	5	11.96
3905	5	11.21	4135	24	11.72	4385	1	11.70	4595	13	11.97
3910	11	11.15	4160	7	11.92	4390	..	..	4615	1	12.02
3915	5	11.57	4165	17	11.91	4395	3	11.95	4620	1	11.80
3920	9	11.41	4170	11	11.88	4400	1	11.96	4625	2	12.12
3925	12	11.33	4175	14	11.90	4405	4	11.87	4630	3	12.00
3960	1	11.60	4180	18	11.91	4410	2	11.87	4635	6	11.84

J. D.	No.	Mean.	J. D.	No.	Mean.	J. D.	No.	Mean.	J. D.	No.	Mean.
4640	1	11.83	5015	6	11.92	5435	1	11.93	5795	1	11.96
4645	5	11.96	5040	3	11.82	5440	..	..	5800	..	..
4650	5	11.93	5045	1	11.89	5445	..	..	5805	..	..
4655	5	11.76	5050	4	11.91	5450	..	..	5810	..	..
4680	3	11.85	5055	1	11.89	5455	..	..	5815	..	..
4685	..	..	5060	..	..	5460	..	..	5820	1	11.38
4690	..	..	5065	4	11.90	5485	..	..	5825	..	..
4695	1	11.98	5070	3	11.82	5490	..	..	5830	..	..
4700	1	11.89	5075	7	11.79	5495	..	..	5835	1	11.77
4705	..	..	5100	2	11.76	5500	..	..	5860	1	12.00
4710	..	..	5105	..	..	5505	2	11.88	5865	2	11.90
4715	2	11.78	5110	1	11.87	5535	2	11.96	5870	10	11.99
4730	1	11.81	5115	..	..	5540	7	11.96	5875	2	11.98
4735	1	12.20	5120	1	11.77	5545	9	11.97	5900	19	11.72
4755	2	11.83	5125	3	11.92	5550	6	11.95	5905	3	11.94
4760	2	11.83	5160	2	11.80	5555	..	..	5910	2	12.04
4765	2	11.85	5165	3	11.88	5560	8	11.73	5915	4	11.64
4770	3	11.84	5170	2	11.92	5565	3	11.80	5920	2	11.77
4795	1	11.98	5175	2	11.88	5585	2	11.98	5925	6	11.90
4800	1	11.88	5180	3	11.88	5590	1	11.90	5930	18	11.81
4805	7	11.97	5185	5	11.87	5595	1	11.67	5935	2	11.93
4810	1	11.86	5190	6	11.87	5600	1	12.14	5965	1	11.96
4815	2	11.86	5195	12	11.87	5605	2	11.99	5970	1	11.96
4820	2	11.79	5220	3	11.85	5610	1	12.00	5975	2	11.90
4825	4	11.87	5225	2	11.95	5635	2	11.72	5980	1	12.06
4830	2	11.99	5230	4	12.00	5640	1	12.14	5985	2	11.98
4855	1	11.75	5235	1	12.01	5645	2	11.99	5990	11	11.98
4860	..	..	5265	1	11.90	5650	6	11.90	6015	1	12.00
4865	2	11.69	5285	7	11.67	5655	5	12.02	6020	..	..
4870	3	11.78	5290	..	..	5660	8	11.99	6025	2	11.80
4875	7	11.85	5295	1	11.80	5665	6	11.87	6030	11	11.82
4880	13	11.62	5300	..	..	5685	6	11.98	6035	1	12.10
4915	1	11.80	5305	2	11.86	5690	8	11.88	6040	8	11.78
4920	..	..	5310	12	11.96	5695	6	11.85	6045	7	12.00
4925	2	11.84	5320	2	11.78	5700	..	..	6050	11	11.96
4930	4	11.92	5350	2	11.93	5705	3	11.99	6080	2	11.73
4935	4	12.08	5355	..	..	5710	..	..	6085	3	11.75
4940	4	11.99	5360	4	11.98	5715	10	11.94	6090	2	11.75
4945	6	11.95	5365	3	11.90	5745	1	12.00	6095	..	..
4965	5	11.70	5370	6	11.97	5750	7	11.85	6100	2	11.76
4970	1	11.50	5390	6	11.97	5755	2	11.93	6105	3	11.53
4975	1	11.75	5395	2	11.68	5760	4	11.90	6125	1	11.82
5000	4	11.93	5400	2	11.82	5765	3	11.95	6130	4	11.51
5005	5	11.96	5405	2	12.02	5770	3	11.95	6135	1	11.96
5010	4	11.94	5410	1	11.98	5775	9	11.99	6140	..	..

J. D.	No.	Mean.	J. D.	No.	Mean.	J. D.	No.	Mean.	J. D.	No.	Mean.
6145	1	12.06	6610	1	11.70	6955	..	..	7385	1	11.80
6170	..	..	6615	..	..	6975	1	11.80	7390	1	11.90
6175	..	..	6620	5	11.88	6980	..	..	7395	..	..
6180	1	11.50	6645	4	11.59	6985	3	12.01	7400	..	..
6185	..	..	6650	2	11.70	6990	2	12.06	7405	5	11.64
6190	..	..	6655	3	11.69	6995	4	12.01	7420	1	12.00
6225	2	11.66	6660	1	11.54	7020	3	11.83	7425	..	..
6230	..	..	6665	1	11.40	7025	2	11.83	7430	2	11.90
6235	..	..	6695	..	..	7030	1	11.80	7435	18	11.79
6240	5	11.34	6700	..	..	7035	..	..	7470	10	11.86
6245	6	11.48	6705	2	11.60	7040	..	..	7475	10	11.82
6250	2	11.70	6710	..	..	7045	3	12.01	7480	2	11.60
6270	..	..	6715	1	11.40	7070	1	11.60	7485	2	11.90
6275	2	11.87	6720	3	11.75	7075	2	11.96	7490	5	11.70
6280	1	11.96	6725	1	11.60	7080	3	11.79	7495	17	11.47
6305	2	11.87	6730	4	11.88	7085	..	..	7500	..	..
6310	4	11.92	6750	5	11.91	7090	..	..	7520	15	11.62
6340	7	11.74	6755	..	..	7095	3	11.87	7525	6	11.57
6345	2	11.95	6760	3	11.72	7120	1	11.60	7530	4	11.52
6350	1	11.86	6765	2	11.93	7125	4	11.75	7560	4	11.68
6355	1	11.96	6770	5	11.62	7130	1	11.40	7565	..	..
6385	4	11.42	6800	6	11.68	7135	2	12.06	7570	..	..
6390	..	..	6805	..	..	7155	..	..	7575	..	..
6395	..	..	6810	6	11.66	7160	2	11.70	7595	2	12.00
6420	1	11.50	6815	5	11.77	7165	2	12.00	7600	..	..
6425	6	11.94	6820	3	11.95	7195	1	12.06	7605	1	11.80
6450	1	12.17	6825	2	11.90	7200	..	..	7635	..	..
6455	2	11.65	6830	1	11.80	7205	4	11.84	7640	..	..
6460	4	11.62	6835	..	..	7210	1	11.70	7645	..	..
6465	4	11.92	6840	2	11.54	7235	1	12.00	7650	..	..
6495	3	11.97	6845	..	..	7240	1	11.50	7655	..	..
6500	..	..	6870	1	12.00	7245	..	..	7675	..	..
6505	2	11.97	6875	1	12.00	7250	..	..	7680	1	11.80
6510	..	..	6880	1	11.96	7255	..	..	7685	1	12.00
6515	2	12.10	6885	..	..	7275	..	..	7690	..	..
6535	..	..	6890	..	..	7280	..	..	7695	..	..
6540	..	..	6895	..	..	7285	..	..	7700	1	11.50
6545	..	..	6900	..	..	7310	..	..	7725	..	..
6550	..	..	6905	..	..	7315	1	12.10	7730	2	11.55
6555	..	..	6910	..	..	7320	..	..	7735	4	11.62
6585	1	11.90	6930	..	..	7340	1	11.90	7765	5	11.82
6590	..	..	6935	..	..	7345	2	11.95	7770	1	11.90
6595	1	11.97	6940	..	..	7350	2	11.90	7775	2	11.80
6600	4	11.55	6945	..	..	7355	..	..	7780	2	11.65
6605	3	11.79	6950	..	..	7360	2	11.80	7785	1	11.60

J. D.	No.	Mean.	J. D.	No.	Mean.	J. D.	No.	Mean.	J. D.	No.	Mean.
7790	3	11.93	7860	4	12.02	7950	3	11.83	8090	..	..
7815	3	11.66	7890	5	11.80	7955	2	11.85	8095	1	11.90
7820	1	11.80	7895	1	11.50	7960	1	12.00	8100	2	11.80
7825	1	12.00	7900	..	..	7985	..	..	8105	4	11.15
7830	1	12.00	7905	2	12.00	7990	..	..	8110	4	11.35
7835	2	11.85	7910	4	11.88	7995	..	..	8115	1	12.00
7840	1	11.90	7930	3	11.67	8000	..	..	8120	1	11.80
7845	4	11.82	7935	2	11.90	8030	1	12.00	8125	1	11.70
7850	7	11.78	7940	3	11.87	8050	..	..	8130	4	11.02
7855	7	11.93	7945	2	11.75	8055	..	..	8135	5	11.24

The mean magnitude at each minimum is shown in Table XII. The magnitudes in the last column of Table XI are grouped beginning with J. D. 3825, and combining those between each maximum. Weights are given proportional to the number of observations. The successive columns of Table XII give the first and last Julian day of each group, the number of observed magnitudes, and the mean magnitude.

TABLE XII.

MEAN MAGNITUDE OF EACH MINIMUM.

First.	Last.	No.	Magn.	First.	Last.	No.	Magn.	First.	Last.	No.	Magn.	First.	Last.	No.	Magn.
3825	3834	12	11.48	4680	4719	7	11.85	5435	5464	1	11.93	6270	6284	3	11.90
3855	3874	25	11.37	4730	4774	11	11.87	5485	5509	2	11.88	6305	6314	6	11.90
3895	3929	70	11.30	4795	4834	20	11.91	5535	5569	35	11.89	6340	6359	11	11.81
3960	3999	29	11.53	4855	4884	26	11.71	5585	5614	8	11.94	6385	6399	4	11.42
4015	4034	15	11.61	4915	4949	21	11.96	5635	5669	30	11.94	6420	6469	11	11.97
4050	4074	25	11.52	4965	4969	7	11.68	5685	5719	33	11.91	6495	6519	7	12.04
4100	4139	88	11.72	5000	5019	19	11.94	5745	5779	29	11.93	6535	6559	..	..
4160	4189	94	11.91	5040	5079	23	11.89	5795	5839	3	11.70	6585	6624	5	11.98
4215	4254	125	11.80	5100	5129	7	11.86	5860	5879	15	11.98	6645	6669	11	11.61
4275	4304	35	11.83	5160	5199	35	11.87	5900	5939	56	11.80	6695	6734	11	11.72
4325	4364	35	11.83	5220	5239	10	11.95	5965	5994	18	11.85	6750	6774	15	11.78
4385	4424	18	11.90	5265	5269	1	11.90	6015	6054	41	11.89	6800	6849	25	11.74
4450	4489	69	11.94	5285	5314	22	11.82	6080	6109	12	11.69	6870	6914	3	11.99
4505	4534	21	11.94	5320	5324	2	11.78	6125	6149	7	11.70	6930	6959	..	..
4560	4599	34	11.93	5350	5354	15	11.95	6170	6194	1	11.50	6975	6999	10	12.00
4615	4659	29	11.90	5390	5414	13	11.91	6225	6254	15	11.49	7020	7049	9	11.89

First.	Last.	No.	Magn.	First.	Last.	No.	Magn.	First.	Last.	No.	Magn.	First.	Last.	No.	Magn.
7070	7099	9	11.83	7310	7324	1	12.10	7565	7609	7	11.79	7890	7914	12	11.75
7120	7139	8	11.77	7340	7364	7	11.89	7635	7659	..	..	7930	7964	16	11.82
7155	7169	4	11.85	7385	7409	7	11.70	7675	7704	3	11.77	7985	8009	..	..
7195	7214	6	11.85	7420	7439	21	11.81	7725	7739	6	11.60	8025	8034	..	..
7235	7259	2	11.75	7470	7504	46	11.72	7765	7794	14	11.81	8050	8059	..	..
7275	7294	..	..	7520	7534	25	11.59	7815	7864	31	11.86	8090	8139	23	11.36

A plot of the magnitudes contained in the last column of Table XII indicates that the magnitude at minimum decreased from 11.3 on J. D. 3900, to 11.8 on J. D. 4500. It retained this value until J. D. 6000. From J. D. 6000 to 7000 the magnitudes were irregular, and from J. D. 7000 to 7800, the magnitude was about 11.6. It is difficult to say whether these variations are real, but the large number of observations on which they depend render it probable that they are substantially correct.

The observations in Table XI have also been grouped according to the time preceding and following each class of maximum. The results are given in Table XIII. The classes of the preceding and following maxima are given in the first column, the letters, L, S, and A, indicating long, short, and anomalous maxima, respectively. The seventh line gives the results when two successive maxima, as J. D. 5025 and 5087, appeared to be long. The results for all are given in the last line. The next eight columns give the number of observed magnitudes and their mean value for the

TABLE XIII.

MEAN INCLINATION AT MINIMUM.

Class.	0–5		5–10		10–15		15–20		20–15		15–10		10–5		5–0		Mean A. D.
	No.	Mean.	No.	Mean.	No.	Mean.	No.	Mean.	No.	Mean.	No.	Mean.	No.	Mean.	No.	Mean.	
L, S	78	11.77	85	11.77	88	11.85	66	11.80	82	11.83	70	11.84	116	11.79	159	11.86	+0.064
S, L	66	11.84	54	11.86	58	11.85	18	11.82	14	11.83	73	11.87	77	11.92	114	11.86	+0.056
L, A	2	11.75	2	11.90	..	..	..	..	..	..	..	..	10	11.99	8	11.95	+0.144
S, A	32	11.64	28	11.62	2	11.98	1	11.80	1	11.80	2	11.98	22	11.61	56	11.71	+0.270
A, S	14	11.81	10	11.82	2	11.60	2	11.90	2	11.90	5	11.70	18	11.62	..	..	−0.045
A, L	42	11.66	22	11.62	28	11.36	15	11.28	13	11.25	22	11.60	40	11.69	40	11.64	+0.130
L, L	3	11.82	1	11.89	4	11.91	1	11.89	..	..	4	11.90	3	12.16	7	11.79	+0.128
All	237	11.76	202	11.77	182	11.78	103	11.73	112	11.76	176	11.82	286	11.79	384	11.81	+0.070

intervals following the preceding maximum expressed at the head of the columns. The next eight columns give similar results for the intervals preceding the following maxima. Thus, from the first line, second and third columns, we see that, after a long, followed by a short, maximum, 78 observations were obtained while the star was at minimum, and within five days after its light had ceased to decrease.

The magnitudes given in the first and second lines of Table XIII are shown in Figures 8 and 9. No changes beyond those due to accidental error are certainly shown in Table XIII. There is no evidence that the star changes during a single minimum.

The results of the present investigation may, therefore, be summarized as follows: — The star SS Cygni is faint, having a magnitude of about 11.8, for two thirds of the time. The variations are then slow, if any, and extend over several years. About once in fifty days, the light suddenly increases to magnitude 8.3 and then gradually diminishes to magnitude 11.8. These maxima are usually alternately long and short. During the long maxima the star is increasing for about 3 days, and diminishing for 16 days. During the short maxima the increase occupies 2 days, and the decrease 9 days. Every two or three years, one or more anomalous maxima occur which differ from each other. From the mean of all the latter, the maximum magnitude is 8.8, the increase and decrease being usually symmetrical and each occupying about 9 days. The mean period from long to long, or from short to short, maxima is $103^d.6$, but this value has changed during the last ten years from about 114 to 80 days. It appears to have increased suddenly during the last year. No change in the magnitude at maximum is perceptible.

PLATE I.

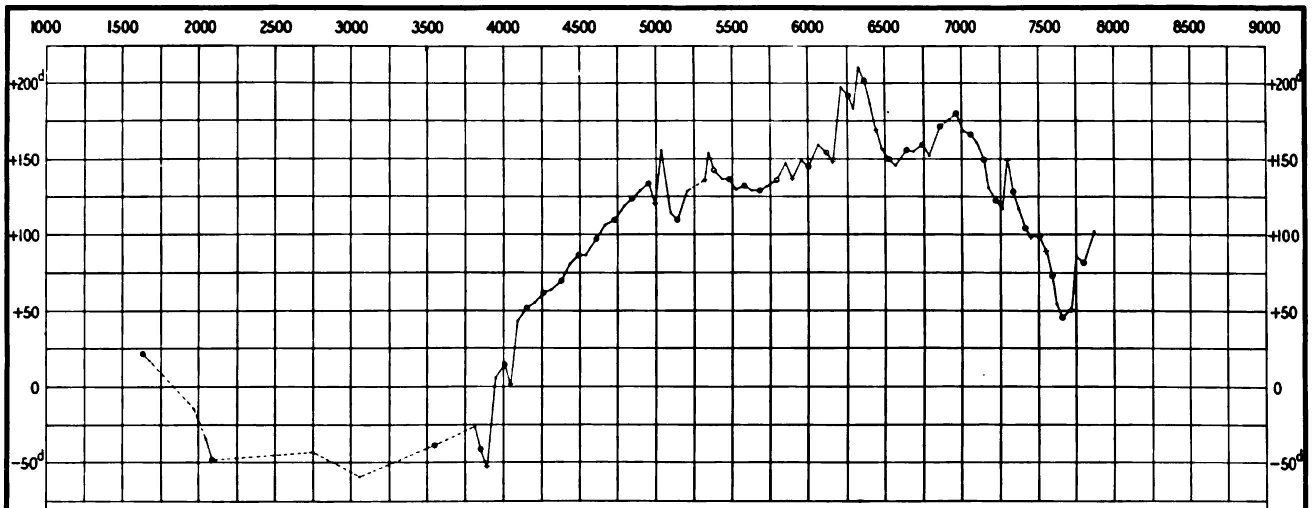


Fig. 1. Deviations from Uniform Period. 1890 – 1907.

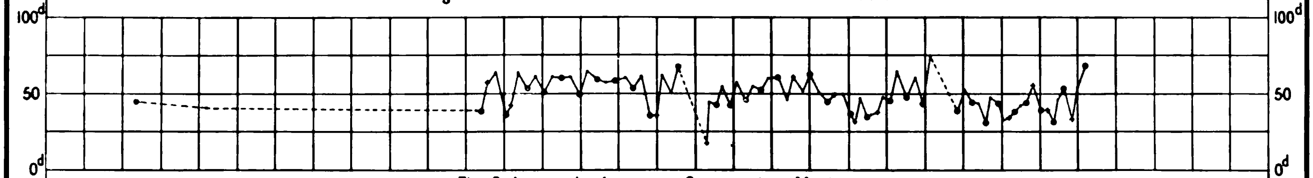


Fig. 2. Intervals between Consecutive Maxima.

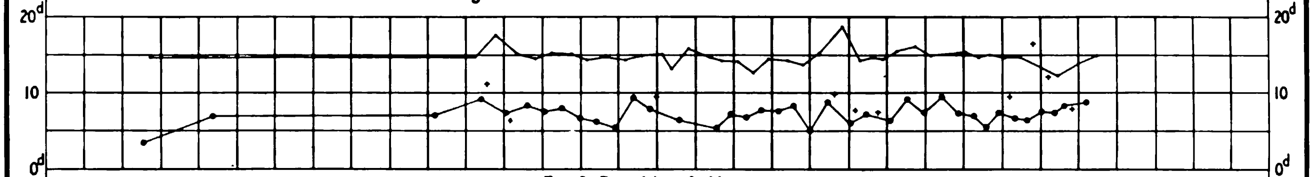


Fig. 3. Breadth of Maxima.

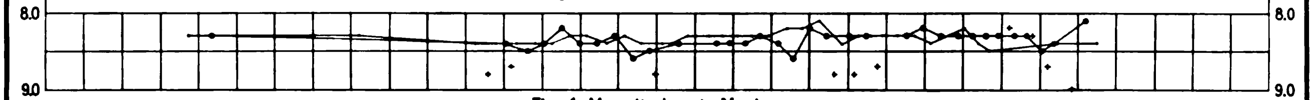


Fig. 4. Magnitude at Maxima.

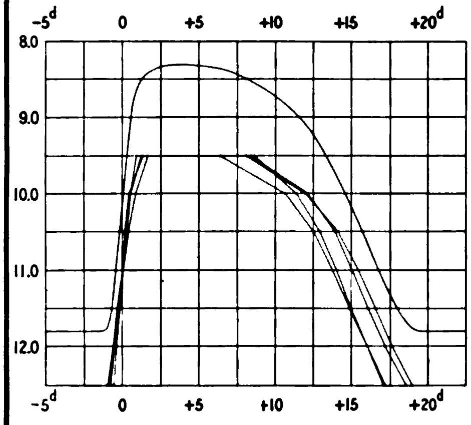


Fig. 5. Long Maxima.

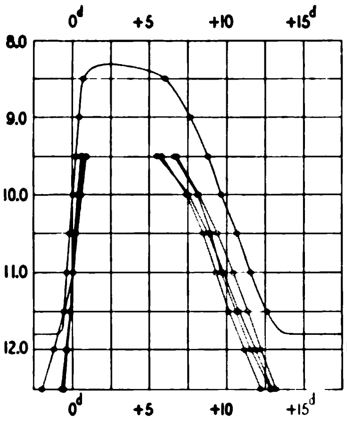


Fig. 6. Short Maxima.

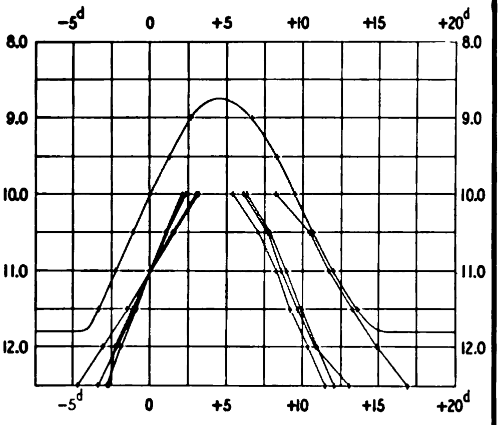


Fig. 7. Anomalous Maxima.

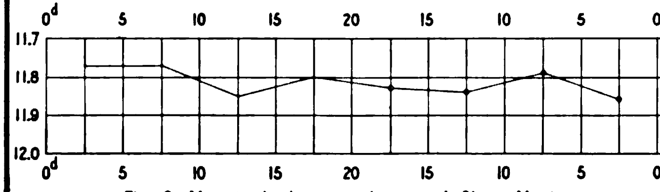


Fig. 8. Magnitude between Long and Short Maxima.

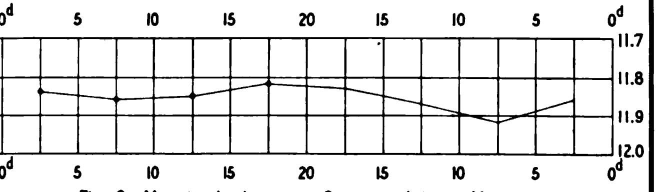


Fig. 9. Magnitude between Short and Long Maxima.

LIGHT VARIATIONS OF SS CYGNI

ANNALS OF HARVARD COLLEGE OBSERVATORY. VOL. LXIV. NO. III.

SCHÖNFELD'S COMPARISON STARS FOR VARIABLES.

SCHÖNFELD'S observations of variable stars extended over many years, and were made with the greatest care. A curious incident regarding their apparent loss is narrated in H. A. 33, 75. Fortunately, these observations have been found, since then, and published in full by Professor Dr. E. Valentiner in the Veröffentlichungen der Grossherzoglichen Sternwarte zu Heidelberg, I. In order to render these observations available for determining the periods and light curves of the variables, they must all be reduced to a uniform scale of stellar magnitudes. This involves, first, the determination of the magnitudes of the comparison stars, and secondly, the reduction of the observations to this scale. The first of these investigations is undertaken in the present memoir. So far as possible, all of the comparison stars are reduced to the photometric scale as determined here with meridian photometers. The results are given in Table I, one line being assigned to the variable and to each comparison star. Following Valentiner, the variables are arranged in the order of constellation, and those in the same constellation, in the order of letter. The name of the constellation is given in the first column, and the designation given to the star by Schönfeld, and in H. A. 37, in the second column. The number of the star in the zone of the Bonn Durchmusterung, the right ascension for 1855, the declination for 1855, and the magnitude according to Schönfeld, which is generally that of the Durchmusterung, are given in the next four columns. The magnitude of the comparison star, expressed in grades as determined by Schönfeld, is given in the seventh column. All of these quantities, except the designations in H. A. 37, given in the second column, are taken from the work of Valentiner mentioned above. The eighth column gives the brightness expressed in grades and taken from Hagen's Catalogue of Variable Stars. Several of the stars in Hagen's Series IV were estimated by him, and also by Hisgen. Hagen's estimates are given in the Table, and Hisgen's estimates are given in the Remarks following it.

Four determinations of the magnitudes of these stars were next made. First, measures with the 4-inch meridian photometer taken from H. A. 50 and 54.

Second, the adopted magnitudes given in the fourteenth columns of Table I and Table XIV of H. A. 37. Third, magnitudes derived graphically from Hagen's grades. Some of these are taken from H. A. 37, Table XVII or XVIII, and the others are derived in the same manner. In a few cases, stars were observed by Hagen which were too faint to be reduced in this way. The estimate, in grades, is then given in the eighth column, but there is no corresponding residual in the tenth column. Fourth, measures as yet unpublished made with the 12-inch Meridian Photometer. The mean of these four magnitudes is given in the ninth column, and residuals from this mean, expressed in hundredths of a magnitude, are given in the tenth column. Negative values are indicated by Italics. The letter A is used when the magnitude depends upon a single determination. The magnitudes according to the estimates of Schönfeld are given in the eleventh column. They are found graphically by plotting points with ordinates equal to the estimates of Schönfeld in grades, as given in the seventh column, and abscissas equal to the adopted magnitudes in the ninth column. The residuals found by subtracting the magnitudes in the ninth column from those in the eleventh are given in the twelfth column. In several cases, the positions of the comparison stars are not given. They are, however, entered in the Table, and may be used in reducing the observations of Schönfeld, if his estimates in grades are given.

Table I is followed by a series of Remarks, which generally relate to uncertainties regarding position or magnitude. They supplement but do not replace the notes given by Valentiner, whose work is here designated by the letter V.

TABLE I.

SCHÖNFELD'S COMPARISON STARS.

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Andromeda	R	58	0 16 24	+37 46.3	. .	. .	. .	. .	. . . .	. .	. .
	p′ .	90	0 33 17	+38 39.0	5.5	38.9	. .	5.42	A . . .	5.28	*14*
	p b	29	0 5 59	+40 14.1	5.7	34.1	. .	5.72	01,00 . .	5.79	07
	n .	56	0 12 6	+39 55.4	6.6	29.0	. .	6.41	A . . .	6.36	*05*
	m d	54	0 15 20	+37 57.0	7.0	26.3	. .	7.00	05,*06* . .	6.68	*32*
	l .	48	0 13 57	+37 23.2	7.5	22.3	0	7.37	*37* . 37 .	7.15	*22*
	k f	39	0 14 38	+36 57.2	7.4	17.8	. .	7.68	*03*,03 . .	7.60	*08*
	h .	68	0 19 27	+37 58.4	8.0	13.4	. .	7.84	A . . .	8.11	27
	g′ g	45	0 15 55	+36 37.8	8.1	12.4	. .	8.08	*04*,03 . .	8.24	16
	g .	46	0 18 9	+38 3.3	8.3	9.1	19	8.58	*11* . 11 .	8.60	02
	f m	65	0 18 30	+37 32.0	9.0	5.0	28	9.17	01,01,*03* .	9.13	*04*
	e n	59	0 16 49	+37 32.9	9.0	2.6	33	9.39	*02*,01,00 .	9.40	01
	d p	57	0 15 53	+37 46.6	9.2	0.2	40	9.65	*12*,04,09 .	9.64	*01*
	c q	53	0 14 46	+37 35.3	9.3	. .	43	9.84	. *04*,05 .	. .	. .
	b s	55	0 15 29	+37 38.6	9.5	. .	54	10.50	. 08,07 .	. .	. .
	q .	. .	0 15 54	+37 47.4	. .	. .	89	11.62	. . A .	. .	. .
	x .	. .	0 16 27	+37 45.6	. .	. .	101	12.02	. . A .	. .	. .
	y .	. .	0 16 25	+37 45.8	. .	. .	. .	. .	. . . .	. .	. .
	z .	. .	0 16 31	+37 44.5	. .	. .	. .	. .	. . . .	. .	. .
Aquarius	R	6352	23 36 19	−16 5.2	. .	. .	. .	. .	. . . .	. .	. .
	n a	6345	23 34 56	−16 15.0	5.3	. .	0	5.53	*09*,02,07 .	. .	. .
	m b	6507	23 43 5	−15 12.3	6.0	. .	. .	5.88	04,*04* . .	. .	. .
	l .	6515	23 45 4	−15 3.4	6.2	40.3	. .	6.00	A . . .	5.92	*08*
	h .	6314	23 27 16	−16 2.5	6.0	31.0	. .	6.15	A . . .	6.48	33
	k c	6373	23 42 1	−16 39.7	6.3	35.5	. .	6.44	*03*,02 . . .	6.20	*24*
	h′ .	6464	23 30 30	−15 53.3	6.5	. .	11	6.68	*02* . 01 .	. .	. .
	e_2 .	6506	23 42 59	−15 47.1	7.5	19.0	. .	7.46	A . . .	7.54	08
	e_1 e	6491	23 38 22	−15 33.6	7.8	. .	20	7.58	02,01,*04* .	. .	. .
	d .	6487	23 36 59	−15 13.6	8.1	14.6	. .	8.02	A . . .	8.02	00
	c .	6341	23 34 28	−16 16.0	8.1	13.1	27	8.28	13 . *13* .	8.24	*04*
	b .	6495	23 38 41	−15 17.8	9.0	8.0	. .	8.98	A . . .	8.97	*01*
	a′ l	6485	23 36 53	−15 46.7	9.0	. .	42	9.23	*04* *01* 06 .	. .	. .
	a n	6479	23 35 44	−15 52.9	9.3	. .	56	9.99	. *18*,18 .	. .	. .
Aquarius	S	6330	22 49 20	−21 7.0	. .	. .	. .	. .	. . . .	. .	. .
	h d	6334	22 49 50	−21 2.6	7.5	27.0	9	7.61	*02*,01,01 .	7.69	08
	g e	6511	22 49 24	−20 19.3	8.0	22.2	. .	8.10	00,00 . .	8.06	*04*
	e g	6333	22 49 43	−21 26.5	8.3	14.7	15	8.54	16,*01*,*16* .	8.66	12
	f h	6325	22 48 8	−21 18.4	8.5	17.8	17	8.60	*03*,*03*,04,02,	8.42	*18*
	d l	6341	22 51 40	−21 39.8	8.9	9.6	21	8.95	*09*,*09*,19 .	9.14	19

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Aquarius	c .	6348	22 52 42	−21 36	8.8	5.9	. .	. .	. . . . .	9.61	. .
	b .	6342	22 51 35	−21 20	9.3	2.9	30	10.25	. . A .	10.15	*10*
Aquarius	T	5390	20 42 17	− 5 41.1	. .	. .	. .	. .	. . . . .	. .	. .
	v e	5382	20 40 37	− 5 9.9	7.5	. .	9	7.17	*07*,03,04 .	. .	. .
	w .	5349	20 34 50	− 5 48.6	7.8	46.5	. .	. .	. . . . .	7.85	. .
	a′ .	5413	20 42 5	− 7 14.0	7.4	. .	. .	7.86	. . . . .	. .	. .
	a g	5396	20 43 4	− 5 19.7	8.0	42.4	15	7.97	13,*14*,01 .	8.26	29
	b′ .	5600	20 42 55	− 6 25.0	8.5	. .	. .	8.71	A	. .	. .
	b m	5393	20 42 41	− 5 39.1	8.3	36.9	25	8.93	*11*,*03*,13 .	8.81	*12*
	p .	. .	. .	. .	. .	31.1	. .	. .	. . . . .	9.38	. .
	f p	5394	20 42 47	− 5 47.7	9.4	24.6	32	9.76	. 03,*02* .	9.96	20
	e .	5395	20 43 0	− 5 46.2	9.5	20.5	40	10.42	. . A .	10.32	*10*
	d s	5389	20 41 47	− 5 39.3	10.0	16.8	. .	11.02	. A . .	10.69	*33*
	k .	. .	20 42 13	− 5 54.4	. .	8.5	. .	. .	. . . . .	11.45	. .
	l t	. .	20 42 20	− 5 50.7	. .	3.5	. .	11.52	. A . .	11.99	47
	m x	. .	20 42 7	− 5 38.5	. .	0.0	. .	12.63	*05*,05 . .	12.34	*29*
Aquila	η	4337	19 45 5	+ 0 38.2	. .	. .	. .	. .	. . . . .	. . .	. .
	δ .	3879	19 18 11	+ 2 50.0	3.2	17.52	. .	3.44	A . . .	3.44	00
	β .	4357	19 48 12	+ 6 3.0	4.0	11.29	. .	3.90	A . . .	3.91	01
	ε .	3736	18 53 3	+14 52.7	3.9	8.41	. .	4.21	A . . .	4.15	*06*
	ι .	3782	19 29 14	− 1 35.7	4.2	5.49	. .	4.28	A . . .	4.36	08
	μ .	4132	19 27 0	+ 7 4.3	4.8	0.00	. .	4.65	A . . .	4.76	11
	ν .	4206	19 19 7	+ 0 3.2	5.0	0.09	. .	4.86	A . . .	4.75	*11*
Aquila	R	3970	18 59 23	+ 8 0.8	. .	. .	. .	. .	. . . . .	. .	. .
	k .	3978	18 48 23	+ 6 26.6	5.8	43.9	. .	5.66	A . . .	5.76	10
	h .	3951	18 55 23	+ 8 10.0	6.5	38.3	. .	6.37	25 . . *25*	6.24	*13*
	h′ .	3989	18 51 18	+ 6 3.1	6.8	37.3	. .	6.38	A . . .	6.32	*06*
	m .	4021	18 59 21	+ 6 56.3	7.2	31.8	. .	6.72	A . . .	6.78	06
	n .	4014	18 58 43	+ 6 20.0	7.0	29.7	. .	6.88	A . . .	6.94	06
	g .	3987	19 3 58	+ 7 53.6	7.2	26.7	. .	7.39	A . . .	7.22	*17*
	f .	3956	18 56 34	+ 8 5.3	7.8	23.1	. .	7.55	A . . .	7.51	*04*
	d′ .	4004	19 5 46	+ 8 22.1	8.0	. .	. .	7.60	A . . .	. .	. .
	e .	3996	19 4 16	+ 8 15.5	8.0	19.5	. .	7.89	A . . .	7.86	*03*
	d .	3960	18 57 55	+ 8 15.5	8.4	16.0	10	8.13	38 . *23*,*16*	8.16	03
	c .	3977	19 0 11	+ 8 7.6	8.7	12.9	17	8.56	53 . *28*,*24*	8.52	*04*
	b .	3961	18 57 58	+ 8 0.4	9.0	10.0	18	8.75	50 . *40*,*11*	8.84	09
	a′ .	3970	19 0 16	+ 7 54.2	9.0	. .	25	8.84	. . *14*,15	. .	. .
	a .	3971	19 0 26	+ 7 57.5	9.0	8.1	27	8.94	13 . *16*,02	9.05	11
	o .	3960	18 59 14	+ 7 49.0	9.4	5.0	45	9.49	. . 06,*06*	9.48	*01*
	p .	3969	18 59 11	+ 8 0.5	9.5	21.0	82	11.18	. . A .	11.16	*02*
	q .	. .	18 59 18	+ 8 6.0	. .	16.3	. .	11.52	. . A .	11.47	*05*
	r .	. .	18 59 19	+ 8 1.3	. .	11.9	96	11.54	. . 17,*17*	11.84	30

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° '							
Aquila	s .	. .	18 59 47	+ 8 0.3	. .	9.1	108	12.20	. . A .	12.12	*08*
	s' .	. .	18 59 44	+ 8 0.7	. .	5.0	155	. .	. . . .	12.52	. .
Aquila	S	4078	20 4 58	+15 11.7	. .	. .	. .	. .	. . . .	. .	. .
	h .	4211	20 4 4	+14 47.2	8.0	. .	67	8.53	*07* . 07 .	. .	. .
	a' .	4080	20 4 59	+15 40.6	9.4	26.8	79	8.90	. . A .	8.93	03
	a .	4079	20 4 58	+15 10.1	9.4	23.6	90	9.36	*04* . 04,00	9.34	*02*
	b .	4070	20 3 30	+15 16.6	9.3	20.1	94	9.72*	*08* . 08 .	9.77	05
	c .	. .	20 5 3	+15 4.6	10.1	17.0	111	10.10	. . A .	10.12	02
	d .	. .	20 4 15	+15 15.1	10.4	13.9	. .	. .	. . . .	10.44	. .
	e .	. .	20 4 56	+15 6.2	11.0	7.2	129	11.10	. . A .	11.08	*02*
	f .	. .	20 4 14	+15 10.5	12.0	0.0	. .	. .	. . . .	11.72	. .
Aquila	T	3835	18 38 47	+ 8 34.8	. .	. .	. .	. .	. . . .	. .	. .
	g .	3832	18 38 15	+ 8 49.0	8.6	. .	29	8.70	. . A .	. .	. .
	f .	3834	18 38 43	+ 8 48.0	8.7	. .	39	9.02	*03* . 08,*05*	. .	. .
	e .	3839	18 39 2	+ 8 4.2	9.5	. .	. .	. .	. . . .	. .	. .
Aries	R	330	2 7 52	+24 22.7	. .	. .	. .	. .	. . . .	. .	. .
	l .	325	2 5 27	+24 55.4	7.5	59.0	. .	7.08	A . . .	7.10	02
	k d	296	2 4 4	+23 17.1	8.1	54.1	. .	7.70	*09*,09 . .	7.70	00
	h .	304	2 7 50	+23 26.5	8.8	49.5	0	8.31	. . A .	8.25	*06*
	g f	306	2 8 21	+23 55.8	9.1	46.2	6	8.74	06,*03*,*03* .	8.52	*22*
	f .	322	2 5 10	+24 42.4	8.8	43.3	. .	8.63	A . . .	8.73	10
	e' g	323	2 5 17	+24 35.8	9.3	38.4	. .	9.21	05,*05* . .	9.13	*08*
	e .	324	2 5 26	+24 41.0	9.2	35.7	. .	. .	. . . .	9.34	. .
	d .	327	2 7 3	+24 24.3	9.4	31.7	20	9.60	. . A .	9.64	04
	c l	331	2 8 16	+24 29.8	9.5	28.6	26	10.03	00,02,*03* .	9.93	*10*
	b .	. .	2 7 8	+24 25.4	. .	25.4	30	10.26	. . A .	10.27	01
	a .	. .	2 7 10	+24 26.6	. .	23.0	34	10.54	. . A .	10.56	02
	a' .	. .	2 7 16	+24 36.6	. .	19.8	. .	. .	. . . .	11.09	. .
	p' .	. .	2 7 27	+24 22.1	. .	14.0	. .	. .	. . . .	12.10	. .
	p r	. .	2 8 5	+24 20.6	. .	12.0	60	12.45	03,*13*,11 .	12.42	*03*
	q .	. .	2 7 41	+24 24.3	. .	10.0	63	12.78	. . A .	12.77	*01*
Aries	S	. .	1 56 51	+11 49.7	. .	. .	. .	. .	. . . .	. .	. .
	k .	. .	. . . . .	. . . .	. .	30.0	. .	. .	. . . .	10.00	. .
	l .	. .	. . . . .	. . . .	. .	23.2	. .	. .	. . . .	10.77	. .
	m .	. .	1 56 28	+11 54.0	. .	23.2	28	10.77	. . *11*,11	10.77	00
	n .	. .	1 56 31	+11 47.2	. .	18.0	43	11.56	. . 09,*09*	11.54	*02*
	b .	. .	1 56 58	+11 55	. .	10.1	59	12.65	. . A .	12.70	05
	a .	. .	1 56 39	+ 11 47	. .	7.4	81	13.53	. . A .	13.27	*26*
	c .	. .	1 56 43	+11 46	. .	5.0	86	13.66	. . A .	13.85	19
Aries	T	351	2 40 12	+16 55.2	. .	. .	. .	. .	. . . .	. .	. .

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Aries	m .	342	2 37 41	+16 23.8	7.8	. .	0	7.30	. . 00,00	. .	. .
	k .	355	2 41 3	+18 7.3	8.1	. .	. .	. .	. . . . .	. .	. .
	h .	345	2 39 16	+16 41.2	8.6	. .	28	8.51	*17* . 09,09	. .	. .
	l .	438	2 39 28	+17 56.2	8.8	. .	. .	. .	. . . . .	. .	. .
	f .	440	2 39 48	+17 0.4	8.9	. .	46	9.37	*20* . 13,08	. .	. .
	g .	358	2 41 48	+16 57.3	9.5	. .	42	9.40	. . A .	. .	. .
	e .	350	2 40 11	+16 48.8	9.5	. .	51	9.60	. . 10,*10*	. .	. .
	d .	347	2 39 23	+16 55.1	9.5	. .	68	10.71	. . *01*,01	. .	. .
	c .	. .	2 42 10	+16 53	. .	. .	. .	. .	. . . . .	. .	. .
Auriga	ε	1166	4 51 35	+43 36.2	. .	. .	. .	. .	. . . . .	. .	. .
	η .	1058	4 56 21	+41 2.4	3.4	. .	. .	3.28	A	. .	. .
	ζ .	1142	4 52 22	+40 51.9	3.6	. . .	. .	3.94	A	. .	. .
	e .	895	3 48 9	+39 35.4	3.2	. .	. .	3.94	A	. .	. .
Auriga	R	882	5 5 35	+53 25.2	. .	. .	. .	. .	. . . . .	. .	. .
	p b	882	5 9 30	+54 6.0	6.3	69.5	. .	6.68	07,*07* . .	6.75	07
	n .	864	5 0 18	+53 15.6	7.5	65.1	. .	7.12	A	7.08	*04*
	m .	863	4 59 54	+53 1.3	7.8	61.4	. .	. .	. . . . .	7.40	. .
	l .	858	4 58 28	+53 28.1	8.1	59.0	. .	. .	. . . . .	7.58	. .
	k d	874	5 5 12	+54 0.2	7.5	56.2	. .	7.76	05,*04* . .	7.78	02
	h e	878	5 5 4	+53 18.1	8.3	52.8	5	8.14	01,02,*02* .	8.07	*07*
	g .	878	5 5 58	+54 13.5	8.5	48.2	. .	. .	. . . . .	8.46	. .
	f f	884	5 5 52	+53 30.6	8.8	44.2	15	8.82	10,00,*11* .	8.85	03
	e g	880	5 5 31	+53 24.6	9.0	40.0	28	9.27	*13*,01,11 .	9.26	*01*
	d .	. .	5 4 52	+53 19.6	9.4	36.2	40	9.90	. . A .	9.67	*23*
	c h	885	5 6 13	+53 13.6	9.5	33.7	36	9.75	05,*03*,*02* .	9.93	18
	b .	887	5 6 36	+53 31.9	9.5	31.4	55	10.45	. . A .	10.20	*25*
	a l	. .	5 6 2	+53 18.7	. .	27.3	75	10.87	. *19*,19 .	10.64	*23*
	r′ .	. .	5 5 48	+53 29.0	. .	22.3	. .	. .	. . . . .	11.25	. .
	r m	. .	5 5 29	+53 16.5	. .	20.4	85	11.33	17,*20*,02 .	11.47	14
	s .	. .	5 5 35	+53 17.5	. .	16.3	. .	. .	. . . . .	12.04	. .
	t q	. .	5 5 26	+53 25.4	. .	11.3	150	12.77	*05*,05 . .	12.77	00
Bootes	R	2400	14 30 48	+27 22.0	. .	. .	. .	. .	. . . . .	. .	. .
	a′ .	. .	. . . . . .	. . . .	. .	60.0	. .	. .	. . . . .	6.86	. .
	a c	2348	14 30 4	+28 7.5	7.0	59.6	. .	6.93	03,*03* . .	6.94	01
	b′ .	2804	14 30 25	+25 5.9	7.5	53.9	. .	7.56	A	7.56	00
	c .	2598	14 40 6	+26 33.0	8.2	46.6	. .	8.16	A	8.18	02
	b f	2592	14 35 24	+26 35.1	7.9	48.2	. .	8.19	*05*,05 . .	8.05	*14*
	d g	2404	14 32 56	+27 26.4	8.2	42.2	0	8.44	*01*,00,00 .	8.50	06
	e h	2396	14 29 39	+27 2.5	8.3	37.4	6	8.84	09,*06*,*04* .	8.92	08
	f .	2423	14 42 41	+27 1.9	8.8	32.4	. .	9.36	A	9.40	04
	g n	2401	14 32 2	+27 0.2	9.3	26.3	30	10.16	. *07*,08 .	10.21	05
	h p	2398	14 29 59	+27 21.1	9.4	22.5	40	10.86	04,01,*06* .	10.72	*14*

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Bootes	k q	2399	14 30 36	+27 22.1	9.5	19.0	47	11.21	*04*,07,*04* .	11.17	*04*
	l r	..	14 31 0	+27 23.5	..	14.6	59	11.71	*03*,02,02 .	11.77	06
	m t	..	14 31 9	+27 27.5	..	10.0	..	12.56	*07*,07 . .	12.56	00
Bootes	S	1671	14 18 1	+54 28.3	..	..	..	..	. . . .	..	..
	l′ .	1666	14 16 36	+54 33.0	8.0	31.4	R	8.16	A . R .	8.23	07
	l .	1661	14 13 42	+54 36.3	8.0	30.2	..	..	. . . .	8.30	..
	k .	1682	14 24 15	+54 20.1	8.5	27.6	..	..	. . . .	8.48	..
	i c	1679	14 20 48	+54 22.2	8.5	25.7	14	8.36	04,03,*06* .	8.63	27
	h e	1709	14 20 3	+53 44.1	9.0	19.9	..	9.12	01,00 . .	9.10	*02*
	f f	1677	14 19 28	+54 6.9	9.3	13.2	43	9.69	01,*02* 02 .	9.68	*01*
	e .	1676	14 19 19	+54 3.0	9.5	10.0	50	10.00	. . A .	10.00	00
	a .	1674	14 18 47	+54 22.1	9.5	..	62	10.48	. . A .	..	..
	c h	1670	14 17 22	+54 32.7	9.5	..	69	10.67	. .*07*,07 .	..	..
	m m	..	14 17 59	+54 31.5	..	..	102	12.11	*05*,*07*,*17*,29	..	..
	p n	..	14 18 20	+54 22.5	..	..	124	12.65	*05*,*15*,02,19	..	..
	n .	..	14 20 40	+54 29.5	..	..	..	..	. . . .	..	..
Camelopard.	R	323	14 28 54	+84 29.2	..	..	..	..	. . . .	..	..
	g .	345	15 35 5	+84 21.7	7.8	27.0	..	..	. . . .	7.55	..
	f′ .	234	13 54 46	+85 13.8	8.1	22.5	..	7.95	A . . .	7.93	*02*
	f .	339	15 12 35	+84 35.2	8.5	21.0	..	..	. . . .	8.05	..
	e b	322	14 25 24	+84 36.4	8.5	17.3	0	8.40	12,05,*16*,01	8.42	02
	d c	326	14 36 34	+84 21.9	9.4	12.4	14	8.95	*01*,07,*05* .	8.97	02
	c .	329	14 46 42	+84 55.7	10.0	8.2	..	9.75	*02* . . 02	9.54	*21*
	b e	324	14 34 41	+84 43.4	10.0	4.6	31	9.78	*11*,04,*05*,13	10.06	28
	a g	325	14 34 56	+84 26.6	10.5	0.0	59	10.95	. *15*,*06*,21	10.84	*11*
Cancer	R	1803	8 8 34	+12 10.1	..	..	..	..	. . . .	..	..
	l .	1746	8 3 22	+10 16.2	6.5	..	..	6.07	A . . .	..	..
	k .	1892	8 2 26	+ 9 35.8	7.2	..	..	6.85	03 . . *03*	..	..
	h .	1787	8 5 38	+11 17.4	7.3	..	0	7.16	14 . *14* .	..	..
	g .	1796	8 7 36	+11 52.7	8.0	..	8	7.55	. . A .	..	..
	e h	1812	8 10 10	+12 6.2	8.5	..	15	8.01	*05*,05,00 .	..	..
	d .	1807	8 9 17	+11 13.3	8.7	..	..	8.79	. . . A	..	..
Cancer	S	2090	8 35 39	+19 33.2	..	..	..	..	. . . .	..	..
	a .	2097	8 37 29	+19 34.3	8.2	..	39	8.00	05 . *06* .	..	..
	d .	2094	8 37 4	+19 24.0	8.5	..	44	8.26	*01* . 02 .	..	..
	g .	2092	8 36 28	+19 56.5	9.1	..	65	9.18	A . *03* .	..	..
	b .	2088	8 34 50	+19 35.6	9.0	..	72	9.36	*06* . 06 .	..	..
	e .	2089	8 35 31	+19 19.4	9.4	..	76	9.58	04 . *03* .	..	..
	f .	2086	8 34 28	+19 22.7	9.5	..	89	10.36	*08* . 07 .	..	..
Cancer	T	2243	8 48 23	+20 23.5	..	..	..	..	. . . .	..	..

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Cancer	g .	2232	8 45 38	+20 31.0	7.2	. .	0	6.86	*04* . 04 .	. .	. .
	f′ .	2119	8 45 6	+19 51.7	8.2	23.8	20	7.90	00 . 00 00	7.90	00
	f .	2244	8 48 38	+20 44.1	8.0	19.3	31	8.26	*03* . 04 .	8.32	06
	e .	2241	8 47 20	+20 33.1	9.0	13.5	59	9.16	*14* . 14 .	9.02	*14*
	d .	2236	8 46 25	+20 23.1	9.2	10.3	65	9.31	*29* . 29 .	9.27	*04*
	c .	2237	8 46 53	+20 24.8	9.1	9.7	64	9.32	*17* . 18 .	9.33	01
	b .	2246	8 49 0	+20 26.5	9.2	6.6	69	9.63	. . 07,*07*	9.76	13
	a .	2239	8 47 8	+20 22.8	9.5	3.3	80	10.49	. . *19*,19	10.46	*03*
	a′ .	. .	8 46 13	+20 30.0	. .	0.0	. .	11.32	. . . A	11.32	00
Cancer	U	2042	8 27 28	+19 23.5	. .	. .	. .	. .	. . . . .	. .	. .
	d .	2045	8 28 15	+19 28.0	9.0	33.1	51	9.17	*12* . 11,01	9.14	*03*
	c .	2046	8 28 12	+19 21.1	9.5	29.2	67	9.83	. . *01*,01	9.91	08
	b .	2037	8 26 16	+19 25.6	9.5	26.0	92	10.52	. . 02,*03*	10.49	*03*
	a .	. .	8 27 59	+19 8.7	. .	21.4	124	11.26	. . 11,*12*	11.22	*04*
	m .	. .	8 27 43	+19 10.2	. .	18.2	132	11.58	. . 00,00	11.61	03
	n .	. .	8 27 39	+19 16.6	. .	15.0	139	11.91	. . *16*,16	12.00	09
	g .	. .	. . . . .	. . . .	. .	9.7	. .	. .	. . . . .	12.50	. .
	h .	. .	8 27 21	+19 20.3	. .	5.0	. .	. .	. . . . .	12.87	. .
Cancer	V	1825	8 13 28	+17 45.2	. .	. .	. .	. .	. . . . .	. .	. .
	q .	1836	8 16 30	+17 39.7	7.0	39.6	0	7.32	*28* . 27 .	7.43	11
	p e	1927	8 14 44	+18 7.9	8.3	32.9	9	7.94	08,*14*,06 .	7.86	*08*
	n .	1923	8 13 38	+18 3.9	8.2	29.0	13	8.18	*03* . 04 .	8.14	*04*
	l g	1917	8 12 55	+18 19.1	8.7	22.1	. .	8.60	*05*,06 . .	8.60	00
	k l	1921	8 13 10	+18 7.3	9.1	17.4	26	9.12	05,02,*11*,04	8.97	*15*
	h .	1826	8 13 39	+17 59.7	9.2	13.7	31	9.34	. . A .	9.33	*01*
	g n	1928	8 14 47	+18 1.4	9.4	9.4	36	9.62	*03*,*01*,05 .	9.81	19
	f .	. .	8 13 55	+17 58	. .	4.7	52	10.85	. . A .	10.52	*33*
	e q	. .	8 13 46	+17 45.2	. .	0.0	57	11.28	05,*01*,*07*,05	11.56	28
Canis Minor	R	1428	7 0 44	+10 15.0	. .	. .	. .	. .	. . . . .	. .	. .
	l .	1539	7 1 54	+ 9 32.4	7.4	39.7	22	6.85	05 . *05* .	6.79	*06*
	k .	1467	7 0 29	+11 9.1	7.5	35.3	37	7.18	*13* . 12 .	7.20	02
	g .	1550	7 2 54	+ 9 36.8	8.3	30.5	50	7.76	*27* . 04,22	7.74	*02*
	f .	1416	6 59 7	+10 58.0	8.4	27.5	58	8.05	*15* . 05,10	8.05	00
	e .	1429	7 0 58	+10 16.3	8.9	. .	67	8.40	*18* . 10,09	. .	. .
	d .	1531	7 1 1	+ 9 56.4	8.9	20.6	74	8.87	*03* . 03 .	8.83	*04*
	h .	1422	6 59 49	+10 13.0	9.0	. .	85	9.11	09 . 09 .	. .	. .
	c .	1430	7 1 8	+10 24.7	9.5	17.1	135	10.40	. . A .	9.21	R
	b .	1427	7 0 32	+10 32.3	9.0	14.3	88	9.19	*21* . 11,10	9.58	39
	a .	1433	7 1 16	+10 22.1	9.3	. .	96	7.46	. . 04,*03*	...	. .
	p .	. .	7 0 5	+10 14	. .	. .	. .	. .	. . . . .	. .	. .
	q .	. .	7 0 34	+10 24.5	. .	. .	. .	. .	. . . . .	. .	. .
	r .	...	7 1 4	+10 13	. .	. .	. .	. .	. . . . .	. .	. .

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Canis Minor	S	1800	7 24 51	+ 8 37.8	..	..	..	..	. . . .	..	..
	h a	1773	7 27 36	+ 7 52.3	7.3	43.5	..	6.67	*05*,05 . .	6.72	05
	g b	1791	7 23 3	+ 8 51.2	7.8	38.7	0	7.10	06,*04*,*01* .	7.08	*02*
	f c	1785	7 21 45	+ 8 8.2	8.0	35.2	..	7.48	04,*04* . .	7.30	*18*
	e d	1789	7 22 38	+ 8 0.2	8.0	31.3	..	7.64	*06*,06 . .	7.60	*04*
	m e	1801	7 24 53	+ 8 57.8	8.5	24.0	9	8.06	06,00,*06* .	8.19	13
	d .	1816	7 27 28	+ 8 50.2	8.2	27.3	..	8.09	A . . .	7.94	*15*
	n f	1807	7 25 21	+ 8 16.7	8.8	20.0	14	8.44	*02*,04,*02* .	8.50	06
	b g	1811	7 26 6	+ 8 32.8	8.0	17.0	..	8.86	07,*07* . .	8.83	*03*
	c .	1795	7 23 46	+ 8 25.2	8.8	15.2	23	8.99	*12* . 12 .	9.02	03
	a .	1804	7 25 10	+ 8 12.6	9.5	0.7	35	9.89	. . A .	9.87	*02*
Canis Minor	T	..	7 25 56	+12 3.0	..	..	..	..	. . . .	..	..
	k .	1599	7 26 40	+12 4.6	8.4	37.9	7	8.64	. . *14*,15	8.78	14
	h .	1602	7 24 46	+11 55.5	9.3	33.3	38	9.49	. . A .	9.25	*24*
	f .	1606	7 25 27	+11 59.7	9.4	26.4	46	9.86	. . *06*,06	10.10	24
	g .	1587	7 24 39	+12 2.7	9.4	28.4	48	9.88	. . A .	9.84	*04*
	e .	1610	7 25 43	+11 56.8	9.5	21.9	75	10.60	. . 06,*07*	10.74	14
	d .	1593	7 25 28	+12 6.1	9.5	18.1	97	11.42	. . 03,*04*	11.28	*14*
	m .	..	7 25 43	+12 6.7	..	12.4	109	12.09	. . *05*,05	12.30	21
	y .	..	7 26 0	+12 3.1	..	6.7	143	13.43	. . A .	13.42	*01*
	x .	..	7 25 55	+12 2.7	..	4.2	183	..	. . . .	13.95	..
Capricornus	R	5663	20 3 10	−14 41.6	..	..	..	..	. . . .	..	..
	β .	5652	20 1 27	−14 42.4	9.2	..	16	9.72	. . *04*,05	..	..
	μ .	..	19 59 53	−14 22.6	..	28.9	..	..	. . . .	9.89	..
	n′ .	5646	20 0 17	−14 40.0	9.3	28.3	..	..	. . . .	9.95	..
	t .	..	20 0 16	−14 19.0	..	26.8	..	..	. . . .	10.15	..
	n .	5667	20 4 16	−14 34.2	9.5	22.8	28	10.65	. . *01*,01	10.66	01
	d .	5658	20 2 24	−14 46.1	9.8	17.8	42	11.36	. . 17,*18*	11.34	*02*
	e .	5660	20 2 27	−14 38.0	10.0	..	41	11.44	. . 02,*02*	..	..
	g .	..	20 3 44	−14 42.8	..	13.1	53	12.21	. . *04*,04	12.02	*19*
	b .	..	20 2 41	−14 44.5	..	11.1	58	12.46	. . *05*,04	12.30	*16*
	r .	..	20 3 15	−14 38.8	..	7.3	74	12.54	. . 28,*29*	12.89	35
	s .	..	20 3 0	−14 43.0	..	5.0	84	13.18	. . A .	13.20	02
Capricornus	T	5960	21 13 59	−15 46.7	..	..	..	..	. . . .	..	..
	l .	5976	21 15 11	−15 26.6	8.8	28.5	12	9.08	. . A .	9.14	06
	m .	5972	21 15 34	−15 39.3	8.9	30.1	12	9.16	. . *08*,08	9.07	*09*
	h .	5959	21 13 56	−15 42.4	9.0	25.5	16	9.33	*01* . 01 .	9.33	00
	k .	5965	21 14 33	−15 23.4	9.3	21.0	22	9.71	. . 01,*01*	9.72	01
	g .	5961	21 14 5	−15 32.0	9.3	17.4	28	10.30	. . *20*,20	10.16	*14*
	d .	5966	21 14 42	−15 40.5	9.5	14.3	35	10.52	. . *02*,01	10.59	07
	e .	..	21 13 48	−15 35.4	..	11.0	49	11.29	. . 03,*03*	11.11	*18*
	a .	..	21 13 45	−15 39.6	..	6.0	59	11.78	. . 09,*09*	11.85	07

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Capricornus	U	5795	20 40 4	−15 18.8	. .	. .	. .	. .	. . . . .	. .	. .
	h .	. .	. . . . . .	. . . .	. .	23.3	. .	. .	. . . . .	. .	. .
	g .	. .	. . . . . .	. . . .	. .	18.7	. .	. .	. . . . .	. .	. .
	f .	. .	. . . . . .	. . . .	. .	12.5	. .	. .	. . . . .	. .	. .
	e .	5797	20 40 38	−15 20.3	9.6	8.5	22	10.86	. . A .	. .	. .
	d .	. .	20 40 44	−15 19.2	. .	5.3	43	12.20	. . A .	. .	. .
	b .	. .	. . . . . .	. . . .	. .	1.6	. .	. .	. . . . .	. .	. .
	a .	. .	. . . . . .	. . . .	. .	*2.2*	. .	. .	. . . . .	. .	. .
Cassiopeia	R	4202	23 51 4	+50 34.9	. .	. .	. .	. .	. . . . .	. .	. .
	λ a	4283	23 30 29	+45 40.6	3.5	. .	. .	4.00	00,00 . .	. .	. .
	q .	3964	23 5 59	+48 36.7	5.0	. .	. .	4.62	A . . .	. .	. .
	p .	3991	23 11 4	+48 13.0	4.9	47.5	. .	4.99	A . . .	4.97	*02*
	n .	4180	23 32 8	+49 40.1	5.7	41.3	. .	5.32	A . . .	5.35	03
	m .	50	0 9 32	+47 8.0	6.0	33.9	. .	5.82	A . . .	5.93	11
	l f	4309	23 53 58	+49 10.3	6.5	30.0	0	6.37	*01*,*11*,13 .	6.28	*09*
	k g	4291	23 50 48	+49 37.9	6.7	25.4	17	6.78	05,*08*,02 .	6.70	*08*
	h h	4208	23 52 11	+50 1.6	7.2	21.1	35	7.21	*04*,*04*,09 .	7.16	*05*
	g .	4314	23 54 59	+49 41.3	7.0	16.5	40	7.38	*01* 02 .	7.64	26
	f′ .	4226	23 55 16	+50 40.1	7.8	12.6	45	7.85	15 . *15* .	8.06	21
	f l	4298	23 52 2	+49 41.9	7.7	. .	52	8.07	09,09,*17* .	. .	. .
	d .	4187	23 48 2	+50 55.4	8.4	8.3	79	8.85	*05* . 05 .	8.62	*23*
	e m	3750	23 51 33	+51 1.2	8.4	7.8	77	8.77	*05*,03,03 .	8.70	*07*
	c .	4210	23 52 49	+50 28.6	8.9	4.3	82	9.12	12 . *12* .	9.10	*02*
	b n	4203	23 51 14	+50 31.0	9.0	2.3	93	9.29	*11*,11,01 .	9.33	04
	a o	4197	23 50 43	+50 25.7	9.3	. .	116	9.88	*08*,05,02 .	. .	. .
Cassiopeia	S	66	1 9 4	+71 50.8	. .	. .	. .	. .	. . . . .	. .	. .
	n .	90	1 5 53	+70 59.7	6.0	36.8	. .	6.38	A . . .	6.42	04
	a .	69	1 13 16	+72 4.9	6.7	27.5	. .	7.16	A . . .	7.22	06
	m c	68	1 8 2	+72 6.4	6.7	30.0	. .	7.22	*04*,05 . .	7.01	*21*
	b .	59	1 2 48	+73 9.1	7.5	22.7	. .	7.72	A . . .	7.62	*10*
	c .	67	1 7 45	+72 38.2	8.5	17.9	. .	. .	. . . . .	8.05	. .
	d .	67	1 9 6	+71 59.0	8.6	13.0	0	8.46	*02* . 03 .	8.46	00
	d′ g	59	1 3 46	+71 43.7	8.3	9.5	6	8.74	*12*,02,01,08	8.80	06
	e′ k	69	1 9 24	+71 48.5	9.5	2.5	34	9.75	*19*,03,16 .	9.84	09
	e .	72	1 9 52	+71 38.0	9.5	3.5	30	9.77	. . A .	9.67	*10*
	f l	74	1 10 8	+71 50.5	9.5	1.3	42	10.13	. *07*,07 .	10.10	*03*
Cassiopeia	T	48	0 15 25	+54 59.5	. .	. .	. .	. .	. . . . .	. .	. .
	n d	59	0 18 15	+54 41.3	7.4	. .	0	7.25	07,*01*,*05* .	. .	. .
	l .	54	0 13 53	+55 24.8	8.3	. .	11	7.68	. . A .	. .	. .
	m .	37	0 12 7	+54 54.6	7.5	. .	7	7.71	20 . *20* .	. .	. .
	k e	49	0 15 36	+54 59.6	8.0	. .	16	7.91	05,*04*,*02* .	. .	. .
	i f	50	0 15 52	+54 35.3	8.0	. .	21	8.15	03,02,*04* .	. .	. .

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residuals.	Sch.	Res.
			h. m. s.	° ′							
Cassiopeia	h .	55	0 14 8	+55 12.7	8.3	. .	28	8.54	09 . *10* .	. .	. .
	g g	52	0 16 32	+54 47.2	8.4	. .	31	8.59	03,*03*,*01* .	. .	. .
	f h	58	0 18 8	+54 54.8	8.9	. .	37	8.93	03,05,*08* .	. .	. .
	e k	63	0 18 39	+54 58.7	9.3	. .	. .	9.42	05,*06* . .	. .	. .
Cepheus	δ	2548	22 23 49	+57 40.9	. .	. .	. .	. .	. . . .	. .	. .
	γ .	928	23 33 26	+76 49.5	3.5	. .	. .	3.42	A . . .	. .	. .
	ζ .	2475	22 5 49	+57 29.3	4.1	. .	. .	3.62	A . . .	. .	. .
	ι .	1814	22 44 32	+65 25.9	3.8	. .	. .	3.68	A . . .	. .	. .
	a .	3875	22 25 19	+49 32.2	4.0	. .	. .	3.85	A . . .	. .	. .
	ε .	2741	22 9 43	+56 19.3	5.1	. .	. .	4.22	A . . .	. .	. .
	ξ .	1802	21 59 36	+63 54.9	4.5	. .	. .	4.40	A . . .	. .	. .
Cepheus	R	117	20 34 37	+88 41.0	. .	. .	. .	. .	. . . .	. .	. .
	p .	104	18 24 17	+88 14.4	8.0	. .	. .	8.11	A . . .	. .	. .
	n .	114	20 17 10	+88 33.5	8.0	. .	. .	8.16	A . . .	. .	. .
	m .	105	18 34 24	+88 43.3	8.5	. .	. .	8.20	A . . .	. .	. .
	l .	115	20 24 15	+88 26.3	8.8	. .	. .	8.88	A . . .	. .	. .
	q .	118	20 53 59	+88 4.7	9.0	. .	. .	9.46	A . . .	. .	. . .
Cetus	*o*	353	2 12 2	− 3 38.2	. .	. .	. .	. .	. . . .	. .	. .
	75 s	353	2 24 46	− 1 40.3	5.6	. .	. .	5.46	08,*08* . .	. .	. .
	k y	374	2 17 39	− 3 26.2	6.7	94.0	. .	6.33	*03*,03 . .	6.15	*18*
	m z	438	2 12 24	− 5 0.6	7.0	87.0	. .	6.61	*06*,06 . .	6.94	33
	x .	394	2 17 39	− 4 33.0	7.0	. .	. .	7.06	A . . .	. .	. .
	n .	340	2 6 23	− 3 42.7	7.7	84.7	. .	7.34	A . . .	7.20	*14*
	p α	372	2 17 4	− 3 45.2	8.2	82.5	. .	7.26	*02*,02 . .	7.51	25
	q β	379	2 12 48	− 4 12.0	8.5	78.7	6	8.04	01,*02*,*04*,06	7.98	*06*
	r .	375	2 17 55	− 3 52.3	8.6	74.5	. .	8.46	A . . .	8.45	*01*
	t γ	390	2 16 22	− 4 2.0	8.6	73.0	. .	8.59	01,*01* . .	8.58	*01*
	u .	345	2 9 31	− 3 34.8	8.5	71.2	23	8.65	11 . *05*,*05*	8.73	08
	s δ	363	2 14 18	− 3 37.6	8.9	70.3	35	8.88	*06*,*06*,02,11	8.81	*07*
	v .	371	2 16 55	− 3 54.0	8.8	70.0	. .	8.78	A . . .	8.85	08
	c ε	355	2 12 11	− 3 38.2	9.0	64.8	42	9.30	*11*,*11*,*10*,30	9.30	00
Cetus	R	. .	2 18 35	− 0 50.0	. .	. .	. .	. .	. . . .	. .	. .
	m c	354	2 14 18	− 0 48.7	7.8	49.3	. .	7.66	*07*,08 . .	7.65	*01*
	l .	360	2 17 43	− 0 1.1	8.5	44.3	. .	8.02	R . . A	8.00	*02*
	k e	367	2 21 2	− 0 53.2	8.3	40.5	10	8.28	*01*,*03*,04 .	8.34	06
	h .	362	2 19 5	− 0 2.6	8.8	33.9	. .	9.20	03 . . 02	9.16	*04*
	g .	339	2 20 14	− 1 3.9	8.9	29.4	29	9.82	. . A .	9.80	*02*
	f k	363	2 19 44	− 0 29.8	9.3	25.2	22	9.51	*09*,*09*,*16*,33	10.58	R
	d .	. .	2 18 44	− 1 14	. .	22.7	. .	. .	. . . .	11.06	. .
	c .	. .	2 18 12	− 0 44.5	. .	18.8	54	11.25	. . A .	11.87	62
	b .	. .	2 18 28	− 0 43	. .	14.8	92	12.80	. . A .	12.76	*04*
	a .	. .	2 18 56	− 0 42	. .	10.0	. .	. .	. . . .	13.93	. .

Constellation.	Des.	DM.	R.A 1855..	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Cetus	S	65	0 16 41	−10 8.1	..	..	..	..	. . . . .	..	..
	. .	..	0 16 50	− 9 45	7.2	..	..	..	. . . . .	..	..
	a c	76	0 19 46	−10 40.8	7.2	60.6	0	7.49	05,*13*,07 .	7.54	05
	b .	58	0 15 24	−10 1.9	7.8	53.6	3	8.07	11 . *13*,02	7.96	*11*
	c e	57	0 15 20	−10 25.5	8.0	50.1	5	8.21	03,*01*,*01* .	8.20	*01*
	d′ g	60	0 15 26	−10 5.0	8.5	45.1	9	8.66	05,05,04,*14*	8.59	*07*
	d .	53	0 13 39	− 9 54.9	8.6	42.4	..	8.71	*05* . . 05	8.84	13
	e k	55	0 13 47	−10 2.3	8.7	36.5	15	9.32	*10*,02,07,03	9.40	08
	f l	64	0 16 56	− 9 55.6	9.3	31.9	19	9.96	12,*09*,*13* .	9.96	00
	S′ m	62	0 16 26	−10 16.1	9.4	..	..	10.22	02,*03* . .	..	..
	g n	61	0 16 6	− 9 45.3	9.5	29.2	27	10.52	*07*,*03*,09,01	10.29	*23*
	h .	71	0 18 39	− 9 58.5	9.5	24.3	32	11.06	. . A .	10.98	*08*
	k .	64	0 16 37	−10 0.5	10.0	19.5	37	11.74	. . A .	11.55	08
Coma Beren.	S	2677	12 48 5	+18 28.3	9.2	..	..	9.54	. . . . A	..	..
	c .	2675	12 47 38	+18 26.6	9.2	..	..	9.48	. . . . A	..	..
	d .	2670	12 46 4	+18 28.0	9.4	..	..	10.02	. . . . A	..	..
Corona Bor.	R	2477	15 42 36	+28 36.1	..	..	..	..	. . . . .	..	..
	a .	2682	15 31 0	+30 28.0	6.5	53.6	..	6.52	A . . .	6.53	01
	b f	2475	15 41 43	+28 55.1	7.4	45.7	0	7.29	14,*11*,*03* .	7.23	*06*
	c h	2469	15 39 10	+28 55.8	7.9	38.9	..	7.92	*02*,01 . .	7.90	*02*
	m k	2487	15 47 10	+28 34.3	8.2	34.7	..	8.35	07,*07* . .	8.36	01
	h .	2718	15 43 16	+29 0.8	9.0	25.6	27	9.10	23 . *22* .	9.34	24
	n n	2484	15 46 4	+28 2.1	9.1	29.5	..	9.18	*02*,02 . .	8.92	*26*
	g .	2717	15 43 4	+29 5.0	9.2	23.4	36	9.46	10 . *10* .	9.61	15
	p o	2486	15 46 20	+28 32.5	8.9	28.3	..	9.48	*02*,01 . .	9.04	*44*
	d′ p	2473	15 41 18	+28 43.5	9.2	19.0	43	9.77	*01*,05,04 .	10.19	42
	d″ q	2474	15 41 21	+28 45.8	9.4	20.7	46	10.08	. 21,*20* .	9.94	*14*
	e r	2476	15 42 25	+28 51.5	9.5	15.3	72	10.73	*06*,*07*,13 .	10.76	03
	f t	..	15 42 33	+28 43.9	10.0	..	96	11.38	*18*,*02*,21 .	..	..
	k w	..	15 42 46	+28 39.0	12.5	..	116	12.19	01,01,*01* .	..	..
	l y	..	15 42 57	+28 38.5	13	..	146	13.06	. 00,01 .	..	..
	l′ .	..	15 43 2	+28 39.5	..	..	163	..	. . . . .	..	..
Corona Bor.	S	2725	15 15 30	+31 53.4	..	..	..	..	. . . . .	..	..
	U	2569	15 12 16	+32 9.4	..	..	..	..	. . . . .	..	..
	r b	2647	15 14 11	+30 7.6	6.0	..	..	5.60	*03*,02 . .	..	..
	q .	2561	15 8 10	+32 19.4	6.5	38.1	..	6.22	A . . .	6.00	*22*
	p c	2574	15 13 38	+33 3.5	6.8	31.6	..	6.16	*02*,03 . .	6.29	13
	n e	2724	15 14 60	+31 58.2	7.3	27.2	3	6.92	*06*,04,01 .	6.55	*37*
	m .	2719	15 12 4	+31 21.1	7.0	23.7	0	6.80	07 . *07*	6.79	*01*
	l .	2581	15 20 11	+32 59.3	7.3	19.8	..	7.04	A . . .	7.11	07
	k g	2578	15 17 30	+32 20.3	7.8	12.4	17	7.88	03,*06*,02 .	7.86	*02*
	h k	2577	15 16 58	+32 3.7	8.1	7.2	26	8.50	04,*03*,00 .	8.45	*05*

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Corona Bor.	h′ .	2572	15 13 48	+32 22.1	9.0	3.7	30	8.86	09 . *10* .	8.87	01
	f′ m	2727	15 15 49	+31 24.5	8.9	. .	37	9.09	*01*,*04*,05 .	. .	. .
	f n	2723	15 14 52	+31 27.2	8.9	0.0	42	9.40	02,*02*,00 .	9.40	00
	e .	2717	15 11 50	+31 48.2	9.4	. .	. .	. .	. . . .	. .	. .
	d p	. .	15 15 38	+31 49.5	9.5	. .	62	10.44	21,*18*,*04* .	. .	. .
	c .	. .	15 14 43	+31 56	10.0	. .	86	11.51	. . A .	. .	. .
	b r	. .	15 15 19	+31 57	10.5	. .	89	11.72	*04*,11,*08* .	. .	. .
	a s	. .	15 15 48	+31 52	11	. .	. .	12.38	*02*,03 . .	. .	. .
	a′ .	. .	15 15 49	+31 56.5	. .	. .	150	13.38	. . A .	. .	. .
Corona Bor.	T	2765	15 53 27	+26 20.1	. .	. .	. .	. .	. . . .	. .	. .
	e .	2595	16 4 6	+27 7.8	6.7	. .	. .	6.68	A . . .	. .	. .
	f .	3020	15 58 5	+25 37.9	7.5	. .	. .	7.06	A . . .	. .	. .
	h .	2767	15 55 3	+26 34.6	7.7	. .	. .	7.89	A . . .	. .	. .
	g .	3009	15 53 24	+25 51.1	8.0	. .	. .	7.96	A . . .	. .	. .
	k .	3003	15 52 39	+25 59.5	8.1	. .	. .	8.36	A . . .	. .	. .
	l .	2565	15 52 49	+27 5.5	8.9	. .	. .	9.36	A . . .	. .	. .
	m .	2761	15 52 25	+26 21.2	9.1	. .	. .	9.76	A . . .	. .	. .
	n .	2764	15 53 22	+26 33.9	9.5	. .	. .	. .	. . . .	. .	. .
Corvus	R	3367	12 12 8	−18 27.0	. .	. .	. .	. .	. . . .	. .	. .
	n .	3426	12 4 51	−19 3.9	7.7	45.4	. .	7.32	A . . .	7.43	11
	m .	3379	12 16 22	−18 25.4	7.0	42.7	0	7.70	*19* . 19 .	7.66	*04*
	l e	3368	12 12 14	−18 23.6	7.8	38.0	4	8.34	07,*07*,*08*,07	8.09	*25*
	k f	3369	12 12 26	−18 28.5	8.3	33.6	7	8.57	*05*,09,*03* .	8.51	*06*
	h .	3466	12 13 20	−19 5.1	8.5	28.6	. .	8.76	. . . .	9.02	36
	g .	. .	12 13 22	−18 20.5	. .	23.7	18	9.58	. . A R	9.57	*01*
	f .	3365	12 11 58	−18 7.0	9.0	21.3	17	9.45	. . A .	9.82	37
	e s	. .	12 12 50	−18 25	. .	17.7	26	10.27	. . A R	10.26	*01*
	d .	3360	12 12 4	−18 26.8	9.9	13.7	32	10.77	. . A .	10.70	*07*
	c .	. .	12 12 53	−18 24	. .	9.3	36	11.12	. . A R	11.52	40
	a .	. .	12 12 58	−18 22.5	. .	2.9	58	12.86	. . A .	12.86	00
Cygnus	χ	3593	19 44 59	+32 33.0	. .	. .	. .	. .	. . . .	. .	. .
	n c	3798	19 50 52	+34 41.9	4.2	40.9	. .	4.04	*01*,00 . .	4.78	74
	φ .	3684	19 33 40	+29 48.8	5.3	40.8	. .	4.79	A . . .	4.79	00
	h f	3587	19 40 56	+33 23.6	5.4	38.2	. .	5.04	*01*,02 . .	4.99	*05*
	b .	3651	19 29 5	+29 8.5	5.8	33.5	. .	5.42	A . . .	5.38	*04*
	f g	3531	19 37 10	+32 6.0	6.0	29.3	. .	5.72	17,*17* . .	5.75	03
	d h	3572	19 38 24	+33 48.6	6.7	27.5	. .	5.84	11,*11* . .	5.92	08
	e k	3558	19 41 2	+32 32.2	6.5	25.7	. .	6.14	04,*05* . .	6.14	00
	c l	3602	19 43 19	+33 4.6	6.9	22.5	. .	6.38	*03*,02 . .	6.58	20
	i .	3634	19 50 32	+32 41.4	7.4	18.0	. .	7.24	A . . .	7.23	*01*
	k p	3578	19 43 28	+32 26.3	8.2	14.2	13	7.57	05,*04*,*02* .	7.65	08
	l r	3589	19 44 28	+32 16.6	8.0	10.3	23	8.16	*13*,*05*,01,17	8.06	*10*
	g s	3587	19 44 10	+32 54.9	8.5	7.2	28	8.39	*06*,00,06 .	8.38	*01*

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Cygnus	m t	3600	19 45 54	+32 43.3	8.9	3.7	36	8.76	*03,08*,11 .	8.75	*01*
	n u	3605	19 46 30	+32 34.8	9.0	0.0	43	9.11	*07,07*,13 .	9.11	00
	p′ .	3582	19 43 59	+32 35.5	9.1	. .	46	9.39	. . A .	. .	. .
	p y	3586	19 44 6	+32 31.4	9.2	. .	53	9.80	. 08,*07* .	. .	. .
	p″ .	3581	19 43 42	+32 33.1	9.3	. .	62	9.80	*30* . 29 .	. .	. .
	s .	3591	19 44 47	+32 28.2	9.5	. .	86	10.90	. . A .	. .	. .
	s′ .	. .	19 44 53	+32 26.3	. .	. .	. .	. .	. . . .	. .	. .
	v .	. .	19 45 3	+32 32.0	. .	. .	141	12.25	. . A .	. .	. .
	u .	. .	19 44 50	+32 31.1	. .	. .	144	12.31	. . A .	. .	. .
	w .	. .	19 45 6	+32 33.1	. .	. .	150	12.32	. . A .	. .	. .
	t .	. .	19 44 36	+32 28.1	. .	. .	146	12.35	. . A .	. .	. .
	ν .	. .	19 45 6	+32 27.5	. .	. .	150	12.43	. . A .	. .	. .
	r‴.	. .	19 45 29	+32 30.5	. .	. .	161	12.69	. . A .	. .	. .
Cygnus	R	3064	19 32 56	+49 52.6	. .	. .	. .	. .	. . . .	. .	. .
	c′ .	2847	19 37 58	+50 11.6	6.3	59.7	. .	6.26	A . . .	6.21	*05*
	c^2 .	2848	19 38 0	+50 11.0	6.2	57.0	. .	6.37	A . . .	6.38	01
	n .	3059	19 32 3	+49 54.8	7.0	54.6	. .	6.63	A . . .	6.53	*10*
	l .	3101	19 42 34	+49 39.0	6.5	49.9	. .	6.78	A . . .	6.89	11
	k g	2829	19 34 25	+50 54.7	7.7	. .	. .	7.26	02,*03* . .	. .	. .
	m h	3092	19 39 57	+49 26.1	7.5	44.6	. .	7.58	06,*06* . .	7.38	*20*
	h′ .	3082	19 37 36	+49 21.3	7.7	39.5	. .	. .	. . . .	7.95	. .
	g .	2844	19 37 20	+50 2.5	7.9	. .	0	8.14	*24* . 23 .	. .	. .
	h l	3083	19 37 52	+49 39.0	8.2	35.2	. .	8.22	*12*,13 . .	8.42	20
	e .	2819	19 31 14	+50 18.1	8.4	. .	6	8.42	*22* . 23 .	. .	. .
	d n	3073	19 34 43	+49 52.5	9.0	29.7	20	9.21	08,*07* 00 .	9.05	*16*
	q .	3071	19 34 17	+49 45.4	9.1	26.7	31	9.63	. . A .	9.43	*20*
	p .	3065	19 32 58	+49 54.2	9.0	23.7	39	9.68	*22* . 22 .	9.85	17
	s r	3068	19 33 38	+49 55.6	9.5	. .	73	10.90	00,03,*02* .	. .	. .
	b .	. .	19 33 45	+49 51.5	. .	. .	77	10.98	. . A .	. .	. .
	a .	. .	19 33 38	+49 51.0	. .	. .	124	11.94	. . A .	. .	. .
	y′ .	. .	19 32 52	+49 46.0	. .	. .	. .	. .	. . . .	. .	. .
	y .	. .	19 32 42	+49 49.0	. .	. .	142	12.33	. . A .	. .	. .
	x .	. .	19 32 47	+49 49.5	. .	. .	150	12.50	. . A .	. .	. .
Cygnus	S	2134	20 2 28	+57 34.1	. .	. .	. .	. .	. . . .	. .	. .
	k c	2124	20 0 23	+57 23.9	8.9	29.4	41	8.76	00,02,*02* .	8.72	*04*
	h d	2135	20 2 29	+57 35.1	8.9	27.2	52	9.17	01,*01*,00 .	9.20	03
	f .	2131	20 2 21	+57 41.5	9.2	22.9	74	10.15	. . A .	10.00	*15*
	g .	2132	20 2 22	+57 42.5	9.2	19.9	70	9.97	. . A .	10.46	49
	e g	2139	20 3 20	+57 29.0	9.5	16.3	76	10.26	. 00,*01* .	10.99	73
	d .	. .	20 2 45	+57 25.5	. .	12.5	101	11.56	. . A .	11.52	*04*
	c .	. .	20 2 31	+57 33.1	. .	9.4	. .	. .	. . . .	11.87	. .
	b .	. .	20 2 41	+57 32.0	. .	6.2	111	12.19	. . A .	12.18	*01*
	a .	. .	20 2 23	+57 31.8	. .	1.3	. .	. .	. . . .	12.59	. .

Constellation.	Des.	DM.	R.A 1855..	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Cygnus	T	4028	20 41 24	+33 50.7	..	..	..	..	. . . .	..	..
	ξ .	4267	20 41 47	+35 57.7	4.6	..	..	4.47	A . . .	..	..
	l .	4079	20 28 16	+34 45.6	5.4	..	..	4.85	A . . .	..	..
	m .	3980	20 48 2	+32 53.2	6.0	..	..	5.68	A . . .	..	..
Cygnus	U		20 15 7	+47 26.3	...	..	..	..	. . . .	..	..
	c b	3139	20 14 11	+45 52.2	6.6	37.2	..	6.23	05,*05* . .	6.25	02
	d .	2906	20 14 8	+46 5.2	8.0	31.5	..	..	. . . .	7.29	.
	e e	3078	20 15 12	+47 27.4	8.3	28.3	28	7.84	*07*,*07*,06,10	7.76	*08*
	f .	3064	20 12 28	+47 23.0	8.4	25.3	32	8.22	05 . 18,22	8.22	00
	g .	3089	20 17 45	+47 18.4	8.5	20.6	48	8.70	. . A .	8.83	13
	h .	2914	20 15 38	+46 50.6	9.0	18.5	..	..	. . . .	9.12	..
	h′ l	3076	20 15 5	+47 17.4	9.5	12.9	85	9.99	*02*,*21*,21,01	9.98	*01*
	k n·	..	20 15 7	+47 40.0	..	10.0	100	10.33	*19*,*17*,37 .	10.37	04
Delphinus	R	..	20 7 55	+ 8 38.8	..	..	..	..	. . . .	..	..
	s c	4461	20 8 26	+ 9 43.0	7.5	56.8	..	7.29	*06*,06 . .	7.28	*01*
	r e	4446	20 6 35	+ 9 17.0	9.0	51.6	..	8.00	*07*,08 . .	8.00	00
	q f	4452	20 7 14	+ 9 3.2	8.4	48.6	0	8.38	10,*09*,*02* .	8.38	00
	p .	4376	20 6 8	+ 8 41.3	8.5	45.1	5	8.62	06 . *06* .	8.66	04
	a .	4383	20 7 15	+ 8 34.7	8.7	42.7	11	8.95	14 . *14* .	8.82	*13*
	b .	4460	20 8 25	+ 9 14.6	8.6	39.3	..	9.09	A . . .	9.01	*08*
	c .	4456	20 7 37	+ 9 25.0	9.0	36.7	..	..	. . . .	9.12	..
	d .	4389	20 8 9	+ 8 54.1	9.3	32.6	21	9.18	. . A .	9.34	16
	e k	4459	20 8 8	+ 9 5.2	9.2	30.0	27	9.47	04,04,*08* .	9.68	21
	f .	..	20 7 21	+ 8 30.7	..	25.1	83	10.93	. . A .	10.54	*39*
	g .	..	20 8 48	+ 8 28.7	..	20.9	87	11.03	. . A .	11.10	07
	h .	..	20 9 0	+ 8 32.5	..	15.9	..	..	. . . .	11.64	..
	k .	..	20 8 55	+ 8 32.8	..	11.2	138	..	. . . .	12.18	..
	l s	..	20 7 53	+ 8 38.3	..	5.1	..	12.77	*02*,02 . .	12.82	05
Delphinus	S	4351	20 36 24	+16 34.2	..	..	..	..	. . . .	..	..
	g .	4355	20 36 47	+16 26.3	8.7	29.6	7	8.55	01 . 01,*02*	8.57	02
	f .	4350	20 36 23	+16 35.3	8.3	32.5	7	8.74	23 . *18*,*05*	8.39	*35*
	h .	4342	20 34 37	+16 29.7	8.9	26.2	13	8.86	. . *08*,07	8.80	*06*
	i .	4386	20 36 9	+17 1.3	9.2	22.4	19	9.02	. . 00,*01*	9.06	04
	k .	4349	20 36 10	+16 43.9	9.5	18.1	25	9.49	. . *19*,19	9.49	00
	l .	4354	20 36 37	+16 40.1	9.5	13.6	37	9.84	. . 00,01	10.01	17
	m .	..	20 36 38	+16 32.3	..	9.4	54	10.64	. . *08*,08	10.62	*02*
	n .	..	20 36 20	+16 42.0	..	4.8	72	11.40	. . *08*,09	11.28	*12*
	o .	..	20 36 45	+16 36.2	..	0.0	82	11.86	. . *19*,18	11.98	12
Delphinus	T	..	20 38 38	+15 52.5	..	..	..	..	. . . .	..	..
	e .	4256	20 40 36	+15 58.7	8.8	..	11	8.48	. . *08*,07	..	..
	f .	4362	20 39 8	+16 5.5	8.8	..	16	9.02	. . *07*,08	..	..

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Delphinus	g .	4235	20 36 51	+15 48.9	9.1	. .	24	9.48	*11* . 10,02	. .	. .
	k .	4254	20 39 43	+15 57.5	9.5	. .	26	9.68	. . 05,*04*	. .	. .
	h .	4242	20 38 14	+15 52.8	9.1	. .	28	9.75	*11* . 12,*02*	. .	. .
	l .	. .	20 39 24	+15 54.8	. .	. .	29	9.96	. . A .	. .	. .
	m .	. .	20 39 17	+15 59.5	. .	. .	38	10.68	. . A .	. .	. .
	i .	4262	20 41 48	+15 54.8	9.1	. .	. .	. .	. . . . .	. .	. .
	n′ .	. .	20 38 50	+15 52.6	. .	. .	43	10.89	. . 15,*15*	. .	. .
	o .	. .	20 38 35	+15 56.2	. .	. .	55	12.00	. . A .	. .	. .
	x .	. .	20 38 52	+15 54.4	. .	. .	58	12.16	. . 00,01	. .	. .
	n .	. .	20 36 54	+15 53.6	. .	. .	. .	. .	. . . . .	. .	. .
Gemini	ζ	1687	6 55 32	+20 46.5	. .	. .	. .	. .	. . . . .	. .	. .
	x .	1759	7 35 43	+24 46.0	3.7	11.0	. .	3.68	A . . .	3.68	00
	ι .	1385	7 16 43	+28 5.1	4.0	7.2	. .	3.89	A . . .	3.89	00
	υ .	1424	7 26 58	+27 12.7	4.2	3.7	. .	4.22	A . . .	4.22	00
Gemini	η	1241	6 6 8	+22 32.8	. .	. .	. .	. .	. . . . .	. .	. .
	ε .	1406	6 35 1	+25 16.0	3.2	11.3	. .	3.18	A . . .	3.16	*02*
	μ .	1304	6 14 13	+22 34.8	3.0	. .	. .	3.19	A . . .	. .	. .
	θ .	1481	6 43 14	+34 7.9	3.2	4.5	. .	3.64	A . . .	3.66	02
	ν .	1441	6 20 22	+20 18.2	4.3	0.0	. .	4.06	A . . .	4.05	*01*
Gemini	R	1577	6 58 38	+22 54.8	. .	. .	. .	. .	. . . . .	. .	. .
	w^2.	1566	6 56 36	+22 52.2	7.1	. .	0	5.92	*01* . 00 .	. .	. .
	h d	1528	7 1 31	+21 29.4	7.0	27.1	. .	6.46	00,01 . .	6.49	03
	g e	1531	6 58 27	+24 23.2	7.1	. .	. .	6.87	03,*03* . .	. .	. .
	y .	1558	6 53 36	+22 17.5	7.0	20.4	. .	7.28	A . . .	7.26	*02*
	t .	1596	7 1 2	+22 35.5	8.0	17.3	17	7.64	21 . *20* .	7.61	*03*
	a h	1569	6 57 33	+22 54.3	8.5	13.3	28	8.09	01,*17*,15 .	8.03	*06*
	f .	1591	6 57 1	+23 29.9	8.5	14.0	. .	8.28	. . . A	7.95	*33*
	b k	1576	6 58 34	+22 44.0	8.4	8.8	27	8.31	19,*06*,*14* .	8.64	33
	q l	1575	6 58 33	+22 36.5	8.8	. .	34	8.70	17,*06*,*10* .	. .	. .
	c m	1604	6 58 42	+23 2.4	9.0	5.5	40	8.98	*02*,*11*,15,00	8.96	*02*
	d n	1581	6 59 3	+22 58.4	9.1	. .	44	9.19	*07*,09,*03* .	. .	. .
	e .	1605	6 58 43	+23 11.3	9.0	. .	48	9.46	. . *05*,04	. .	. .
Gemini	S	1796	7 34 22	+23 47.3	. .	. .	. .	. .	. . . . .	. .	. .
	m .	1787	7 32 58	+23 25.0	8.5	. .	15	8.18	*22* . 21 .	. .	. .
	c .	1795	7 34 21	+23 36.1	8.3	42.0	16	8.46	03 . *01*,*01*	8.43	*03*
	d .	1797	7 34 29	+23 53.2	8.5	37.1	25	8.96	*07* . 01,07	8.84	*12*
	n .	1790	7 33 16	+23 22.4	8.8	32.9	33	9.18	*05* . 21,*15*	9.24	06
	g′ .	1799	7 34 55	+23 2.5	9.0	29.8	. .	9.58	. . . A	9.59	01
	g .	1798	7 34 38	+23 45.5	9.5	25.9	46	10.11	. . 01,*01*	10.28	17
	w .	. .	7 34 1	+23 50.2	10.0	20.8	68	11.46	. . *05*,04	11.21	*25*
	x .	. .	7 35 31	+23 45.8	10.5	16.0	. .	11.88	. . . A	11.88	00

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Gemini	y .	. .	7 35 19	+23 48.2	10.9	12.8	. .	11.93	. . . A	12.09	16
	l .	. .	7 35 25	+23 46.6	11.2	10.0	82	12.18	. . A .	12.20	02
Gemini	T	1778	7 40 36	+24 5.3	. .	. .	. .	. .	. . . .	. .	. .
	l .	1779	7 40 52	+24 36.9	8.0	36.4	8	7.98	11 . *12* .	7.96	*02*
	h .	1786	7 42 2	+24 8.7	8.2	31.0	15	8.41	02 . *05*,04	8.39	*02*
	k .	1766	7 37 55	+24 11.2	8.6	26.4	. .	8.69	A . . .	8.81	12
	o .	1775	7 39 58	+24 26.7	8.6	25.8	24	8.87	*04* . 07,*03*	8.86	*01*
	d .	1771	7 38 54	+24 7.7	9.1	21.2	31	9.39	. . A .	9.33	*06*
	i .	1781	7 41 9	+24 23.3	9.1	16.8	36	9.69	. . A .	9.82	13
	n .	. .	7 40 5	+23 48.3	9.5	13.5	43	10.14	. . A .	10.24	10
	m .	. .	7 40 5	+23 56.6	9.5	10.0	52	10.76	. . A .	10.68	*08*
	e .	. .	7 40 44	+24 0.3	. .	6.8	59	11.02	. . 22,*21*	11.11	09
	g .	. .	7 40 25	+24 7.7	11.0	. .	63	11.66	. . A .	. .	. .
Gemini	U	1807	7 46 30	+22 22.7	. .	. .	. .	. .	. . . .	. .	. .
	p a	1808	7 46 35	+22 2.6	8.2	41.0	0	8.49	*07* . 01,00	8.50	01
	o b	1813	7 47 58	+22 15.7	8.7	36.5	6	9.01	26 . *03*,*03*	9.02	01
	m d	1811	7 47 50	+22 13.5	9.3	35.9	10	9.29	. . *01*,07	9.16	*13*
	n c	. .	7 48 13	+22 6.0	9.4	35.1	5	9.14	. . *24*,02	9.16	02
	q e	1806	7 45 48	+22 56.1	8.9	31.9	14	9.51	43 . 07,*23*	9.47	*04*
	r g	. .	7 45 40	+22 57.5	. .	27.2	23	10.10	. . 02,01	9.99	*11*
	k f	1824	7 50 34	+22 17.6	9.5	25.7	. .	10.06	. . . *10*	10.17	11
	i n	. .	7 45 24	+22 37	. .	. .	26	10.37	. . *10* .	. .	. .
	l m	1826	7 50 52	+22 9.8	9.5	24.3	. .	10.29	. . . 01	10.35	06
	h o	. .	7 51 3	+22 11.0	10.3	20.8	. .	10.86	. . . *06*	10.92	06
	f q	. .	7 46 31	+22 28.3	10.9	18.7	45	11.43	. . *13*,11	11.29	*14*
	g r	. .	7 46 38	+22 18.3	10.7	16.6	57	11.68	. . 28,03	11.74	06
	d s	. .	7 46 48	+22 23.0	11.4	15.2	66	12.29	. . 09,*27*	12.04	*25*
	e t	. .	7 46 37	+22 26.6	11.3	12.4	63	12.42	. . *17*,18	12.48	06
	c′ u	. .	7 45 48	+22 19	. .	. .	. .	12.56	. . . .	. .	. .
	c w	. .	7 45 49	+22 26.0	11.7	. .	8.6	13.01	. . 11,19	. .	. .
	a′ x	. .	7 46 33	+22 22.0	. .	2.0	. .	13.31	. . . *02*	13.30	*01*
Hercules	R	3117	15 59 42	+18 45.9	. .	. .	. .	. .	. . . .	. .	. .
	h e	3125	16 3 12	+18 49.4	8.0	41.6	0	8.39	05,*04*,*01* .	8.41	02
	g f	3113	15 59 4	+18 58.4	9.0	37.7	11	8.78	10,*15*,04 .	8.69	*09*
	f h	3114	15 59 12	+18 56.3	9.0	33.9	17	9.06	03,00,*03* .	9.00	*06*
	e k	3110	15 58 12	+18 28.7	8.9	30.5	26	9.30	04,*01*,*02* .	9.28	*02*
	d l	3121	16 0 18	+18 44.3	9.1	27.9	31	9.42	*02*,04,*02* .	9.48	06
	x .	3111	15 58 56	+18 39.2	9.5	22.8	51	9.87	. . A .	9.92	05
	b .	3112	15 58 59	+18 50.7	9.5	19.6	62	10.19	. . A .	10.33	14
	a o	3116	15 59 42	+18 33.2	9.5	17.5	80	10.75	*05*,*05*,10 .	10.68	*07*
	p q	. .	16 0 24	+18 32.2	. .	11.0	105	11.87	*05*,01,03 .	11.98	11
	q .	. .	16 0 10	+18 46.7	. .	8.0	123	12.66	. . A .	12.65	*01*

Constellation.	Des.	DM.	R. A. 1855.			Dec. 1855.		DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h.	m.	s.	°	′							
Hercules	S	3063	16	45	18	+15	11.4	..	..	..	..	. . . . .	..	..
	h b	3066	16	45	29	+15	13.4	6.1	62.1	..	6.41	00,00 . .	6.33	*08*
	g d	3058	16	43	24	+15	39.0	6.8	56.1	..	6.96	02,*03* . .	7.01	05
	f f	3072	16	46	48	+15	39.2	7.8	50.8	0	7.56	*08*,04,03 .	7.60	04
	e h	3070	16	46	28	+15	7.6	8.5	45.2	10	8.30	07,01,04,*14*	8.26	*04*
	d′ k	3060	16	44	15	+15	5.7	8.9	40.6	16	8.87	08,*09*,*09*,09	8.84	*03*
	d .	3067	16	45	39	+15	50.3	9.3	36.3	..	..	. . . . .	9.58	..
	c .	3053	16	44	46	+16	5.3	9.3	32.9	..	..	. . . . .	9.62	..
	b .	3132	16	45	20	+14	27.9	9.3	28.4	..	..	. . . . .	10.03	..
	a p	3064	16	45	27	+15	9.9	9.5	23.7	40	10.42	07,08,*16* .	10.48	06
	l .	3062	16	45	12	+15	18.2	9.5	19.4	49	10.64	. . A .	10.91	27
	m .	..	16	45	3	+15	4.9	..	15.5	76	11.43	. . A .	11.31	*12*
	n .	..	16	45	34	+15	17.7	..	10.5	107	11.94	. . A .	11.65	*29*
	n′ .	..	16	45	38	+15	17.3	..	6.0	125	12.18	. . A .	12.20	02
Hercules	T	3137	18	3	37	+30	59.7	..	..	..	..	. . . . .	..	..
	n .	3190	18	3	47	+29	55.5	7.2	52.1	..	7.01	A . . .	7.01	00
	m c	3133	18	2	43	+30	58.7	7.5	47.2	11	7.26	06,*09*,03 .	7.40	14
	l f	3196	18	5	30	+31	12.5	8.2	41.7	18	7.97	13,13,*27* .	7.84	*13*
	k .	3180	18	3	8	+31	26.2	8.0	36.9	25	8.28	19 . *19* .	8.20	*08*
	i g	3177	18	2	36	+31	29.4	8.8	33.1	34	8.48	*01*,*09*,10 .	8.45	*03*
	h h	3127	18	1	24	+30	53.7	8.8	30.1	34	8.48	*05*,*05*,10 .	8.65	17
	g k	3166	18	0	57	+31	3.6	9.0	26.5	38	8.83	*06*,11,*04* .	8.95	12
	f .	3131	18	2	25	+30	37.5	9.5	22.3	54	9.63	. . A .	9.46	*17*
	e m	3139	18	3	46	+30	39.9	9.5	21.7	47	9.38	05,06,*12* .	9.55	17
	d n	3136	18	3	37	+30	50.1	9.4	18.4	65	9.90	*10*,*08*,18 .	10.10	20
	c p	3185	18	3	34	+31	0.8	9.5	15.3	79	11.00	12,*03*,09 .	10.71	*29*
	b .	3135	18	3	16	+30	58.5	9.5	13.4	84	11.16	. . A .	11.10	*06*
	a q	..	18	3	20	+30	54	11.0	10.3	93	11.66	07,*01*,*06* .	11.68	02
	a′ r	..	18	3	10	+30	56	12.0	6.7	113	12.40	*08*,01,06 .	12.40	00
	a″ .	..	18	3	5	+30	55.5	12.5	2.5	141	..	. . . . .	..	..
Hercules	U	3098	16	19	24	+19	12.7	..	..	..	..	. . . . .	..	..
	l .	2943	16	20	6	+16	17.6	7.0	..	..	6.77	A . . .	..	..
	k e	3182	16	22	30	+18	44.2	7.0	50.9	..	7.02	02,*03* . .	6.70	*32*
	g f	3107	16	22	14	+19	19.9	7.0	43.5	..	7.18	00,00 . .	7.55	37
	h .	3096	16	18	53	+19	34.9	7.0	48.0	..	7.30	A . . .	7.02	*28*
	f l	3102	16	20	50	+19	19.9	7.6	37.0	0	8.19	*05*,*01*,06 .	8.26	07
	e .	3100	16	20	8	+19	48.9	8.7	32.5	..	..	. . . . .	8.78	..
	d p	3097	16	19	12	+19	16.1	9.1	28.9	12	9.31	09,*02*,*06* .	9.35	04
	c .	..	16	19	1	+19	16.8	9.5	23.5	..	..	. . . . .	10.11	..
	b′ s	3095	16	18	39	+19	13.7	9.5	18.9	40	10.82	*07*,06,00 .	10.72	*10*
	b .	..	16	19	58	+19	13.6	..	15.1	46	11.11	. . A .	11.15	04
	a t	..	16	19	2	+19	13.1	..	11.0	56	11.60	00,00,*01* .	11.62	02
	a′ .	..	16	18	6	+19	16.7	..	5.8	..	..	. . . . .	12.25	..

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Hydra	R	3601	13 21 47	−22 31.9	. .	. .	. .	. .	. . . . .	. .	. .
	γ .	3554	13 11 15	−22 24.0	3	. .	. .	3.33	A . . .	. .	. .
	α .	R	12 0 57	−23 55.2	R	. .	. .	4.18	A . . .	. .	. .
	61 .	3813	13 10·48	−17 30.6	5.0	. .	. .	4.80	A . . .	. .	. .
	ψ .	3449	12 46 48	− 8 44.8	5.3	. .	. .	4.91	A . . .	. .	. .
Hydra	S	2085	8 46 0	+ 3 36.4	. .	. .	. .	. .	. . . .	. .	. .
	y .	2057	8 41 0	+ 3 5.4	7.3	. .	. .	7.11	A . . .	. .	. .
	f c	2088	8 46 21	+ 2 22.3	7.8	. .	. .	7.18	*02*,01 . .	. .	. .
	f .	2073	8 42 22	+ 2 54.1	7.5	. .	. .	7.31	A . . .	. .	. .
	d d	2093	8 47 38	+ 3 11.2	8.1	. .	0	7.74	02,01,*02* .	. .	. .
	e .	2055	8 40 27	+ 3 1.4	8.0	. .	. .	8.20	A . . .	. .	. .
	c e	2088	8 46 47	+ 3 39.9	8.7	. .	5	8.30	14,*05*,*08* .	. .	. .
	a g	2081	8 45 18	+ 3 34.0	9.0	. .	11	8.87	07,04,*10* .	. .	. .
	b .	2076	8 44 21	+ 3 33.7	8.8	. .	14	8.96	*03* . 03 .	. .	. .
	g h	2083	8 45 27	+ 3 55.1	9.3	. .	20	9.35	*13*,07,07 .	. .	. .
	h k	2077	8 44 40	+ 3 17.0	9.5	. .	25	9.80	. 08,*08* .	. .	. .
	k .	2090	8 47 27	+ 3 33.4	9.3	. .	33	10.18	. . A .	. .	. .
	m .	. .	8 47 0	+ 3 44.2	. .	. .	41	10.60	. . A .	. .	. .
	x .	. .	8 46 8	+ 3 37.3	. .	. .	68	11.93	. . A .	. .	. .
	l .	. .	8 47 4	+ 3 35.4	. .	. .	. .	. .	. . . . .	. .	. .
Hydra	T	2525	8 48 36	− 8 35.5	. .	. .	. .	. .	. . . . .	. .	. .
	α b	2518	8 47 11	− 8 12.8	7.0	33.3	0	7.45	*03*,*03*,05 .	7.44	*01*
	k c	2504	8 44 17	− 8 35.2	7.5	30.9	. .	7.78	06,*05* . .	7.64	*14*
	q .	2509	8 44 41	− 8 35.1	8.2	24.8	. .	. .	. . . . .	8.16	. .
	p e	2693	8 48 25	− 9 21.8	7.5	21.9	. .	8.26	04,*05* . .	8.52	26
	a g	2520	8 47 20	− 8 40.0	8.3	18.0	11	8.82	15,03,*18* .	8.84	02
	d k	2532	8 49 43	− 8 30.7	8.8	13.3	21	9.34	*10*,03,07 .	9.38	04
	f .	. .	8 50 19	− 8 33	. .	12.4	. .	. .	. . . . .	9.46	. .
	b .	2519	8 47 15	− 8 29.9	9.3	10.8	25	9.68	. . A .	9.69	01
	g n	2527	8 48 45	− 8 31.2	10.5	5.8	37	10.26	. *23*,24 .	10.38	12
	h q	. .	8 48 4	− 8 37.7	11.0	0.0	47	11.24	03,*05*,02 .	11.29	05
	l .	. .	8 49 10	− 8 34.5	11.0	. .	45	11.24	. . *19*,18	. .	. .
	i t	. .	8 48 31	− 8 33	11.5	. .	63	12.19	00,*02*,02 .	. .	. .
Leo	R	2096	9 39 45	+12 1.8	. .	. .	. .	. .	. . . . .	. .	. .
	ν .	2183	9 50 27	+13 7.2	5.5	41.7	. .	5.18	A . . .	5.50	32
	n .	2090	9 38 34	+12 29.2	6.2	36.6	0	5.84	03 . *04* .	5.84	00
	l .	2095	9 39 39	+12 15.0	7.0	28.6	15	6.48	*11* . 12 .	6.40	*08*
	k .	2105	9 43 2	+12 30.7	6.8	26.8	20	6.73	*07* . 07 .	6.56	*17*
	h .	2049	9 37 42	+10 53.2	7.6	22.6	. .	6.70	A . . .	6.91	21
	g .	2054	9 40 1	+10 44.5	7.7	18.4	. .	7.30	A . . .	7.31	01
	f .	2102	9 39 42	+11 30.5	7.8	14.2	34	7.84	*03* . *04*,07	7.81	*03*
	e .	2099	9 41 12	+12 46.6	8.5	10.2	48	8.29	*07* . 11,*03*	8.30	01

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Leo	d .	2101	9 41 49	+12 46.7	9.0	5.5	55	8.82	13 . *02,12*	9.03	21
	a .	2093	9 39 27	+12 5.6	9.4	5.2	65	9.14	*06* . 06,*01*	9.08	*06*
	β .	2094	9 39 33	+12 2.9	9.5	2.4	81	9.65	*09* . 15,*07*	9.58	*07*
	γ .	2105	9 40 34	+11 58.6	9.3	0.0	. .	9.54	. . . .	10.20	. .
Leo	S	. .	11 3 21	+ 6 14.9	. .	. .	. .	. .	. . . . .	. .	. .
	f .	2458	11 3 50	+ 5 52.6	9.0	22.1	20	9.77	. . *07*,07	9.78	01
	e .	2459	11 4 18	+ 5 44.7	9.5	18.6	. .	. .	. . . . .	10.59	. .
	d .	. .	11 2 29	+ 6 17.4	10.5	13.7	53	11.70	. . *19*,19	11.40	*30*
	c .	. .	11 2 15	+ 6 15.9	. .	9.5	59	11.82	. . A .	12.01	19
	b .	. .	11 2 25	+ 6 15.9	. .	4.4	74	12.53	. . *03*,03	12.56	03
	a .	. .	11 3 27	+ 6 13.2	. .	0.0	92	12.94	. . 00,00	12.95	01
Leo Minor	R	2050	9 36 53	+35 10.4	. .	. .	. .	. .	. . . . .	. .	. .
	p b	2042	9 33 58	+35 44.0	6.5	48.9	. .	6.01	02,*02* . .	6.29	28
	q′ .	2034	9 31 12	+35 59.6	7.0	44.6	. .	6.96	A . . .	6.75	*21*
	q d	2035	9 40 24	+34 46.7	6.3	43.0	. .	7.00	10,*09* . .	6.91	*09*
	b e	2022	9 35 2	+34 45.9	7.2	39.3	0	7.20	14,*11*,*22*,17	7.29	09
	a g	2046	9 35 32	+35 21.8	7.7	34.4	9	7.76	18,*06*,*26*,12	7.81	05
	n .	2039	9 33 9	+35 13.0	7.5	31.9	. .	8.17	00 . . 00	8.09	08
	m k	2048	9 36 1	+35 37.6	8.4	28.8	25	8.45	*07*,02,05 .	8.45	00
	l l	2029	9 38 16	+34 26.4	8.5	24.1	. .	8.86	08,*07* . .	8.89	03
	c m	2054	9 38 21	+35 1.9	9.0	21.6	31	9.06	15,*02*,*20*,08	9.15	09
	d .	2049	9 36 50	+35 36.1	8.9	18.7	41	9.33	. . 09,*09*	9.44	11
	e p	2051	9 37 27	+35 32.6	9.1	15.3	48	9.82	*15*,16,00 .	9.79	*03*
	f .	2057	9 39 4	+35 17.4	9.5	12.0	55	10.14	. . 03,*04*	10.14	00
	g q	2053	9 38 20	+35 19.4	9.5	8.0	64	10.58	. *07*,04,02	10.55	*03*
	h .	. .	9 36 52	+35 20.6	. .	4.1	. .	10.90	. . . A	10.99	09
Lepus	R	915	4 52 59	−15 1.8	. .	. .	. .	. .	. . . . .	. .	. .
	a .	1003	4 51 6	−14 27.4	6.3	20.3	0	5.94	*07* . 06 .	5.94	00
	b .	1029	4 57 20	−14 45.8	7.0	14.9	7	6.85	05 . *05* .	6.85	00
	c .	903	4 49 22	−15 6.7	7.7	10.0	28	7.71	01 . *01* .	7.71	00
Libra	*δ*	3938	14 53 14	− 7 56.4	. .	. .	. .	. .	. . . . .	. .	. .
	f .	4171	15 26 15	− 9 33.7	4.9	. .	. .	4.83	A . . .	. .	. .
	ε .	4138	15 16 20	− 9 47.8	5.0	. .	. .	5.08	A . . .	. .	. .
	d .	4010	15 26 36	− 8 41.3	5.5	. .	. .	5.15	A . . .	. .	. .
	c .	4031	15 30 51	− 8 18.8	7.0	. .	. .	5.82	A . . .	. .	. .
	b .	3944	14 54 26	− 7 18.8	6.5	. .	. .	6.57	A . . .	. .	. .
Libra	R	4208	15 45 24	−15 48.1	. .	. .	. .	. .	. . . . .	. .	. .
	e .	. .	15 44 56	−16 10.3	. .	14.7	. .	9.94	. . . A	9.94	. .
	d .	. .	15 45 19	−15 59.6	. .	10.5	. .	10.79	. . . A	10.79	. .
	c .	. .	15 44 51	−15 54.5	. .	6.0	. .	. .	. . . . .	11.43	. .

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Libra	b .	..	15 45 29	−15 46.0	..	2.1	..	..	. . . . .	12.00	..
	x .	..	15 45 21	−15 46.9	..	0.0	..	..	. . . . .	12.30	..
Libra	S	4084	15 13 4	−19 51.6	..	..	..	..	. . . . .	..	..
	n c	4099	15 16 11	−19 26.6	8.2	25.9	..	7.76	00,00 . .	7.76	00
	l g	4224	15 15 49	−20 19.0	8.6	17.0	15	8.66	*11*,*03*,14 .	8.63	*03*
	k h	4075	15 11 8	−19 25.6	9.0	13.3	15	8.85	02,02,*05* .	9.04	19
	h k	4072	15 10 51	−19 34.7	9.1	11.4	..	9.29	. A . .	9.27	*02*
	g m	4082	15 12 46	−19 55.7	9.3	7.9	24	9.76	. 12,*13* .	9.69	*07*
	f n	4083	15 12 52	−19 58.3	9.5	4.0	31	10.19	00,00,00 .	10.15	*04*
Lynx	R	1154	6 49 18	+55 30.2	..	..	..	..	. . . . .	..	..
	q d	1164	6 53 14	+55 55.2	8.0	19.9	0	7.97	*03*,05,*01* .	7.97	00
	p .	1171	6 48 2	+56 18.0	8.0	18.4	..	..	. . . . .	8.06	..
	a′ .	1167	6 54 57	+55 24.3	8.0	15.8	..	..	. . . . .	8.30	..
	a e	1150	6 48 10	+55 56.2	8.5	11.3	17	8.61	08,*01*,*06* .	8.69	08
	b f	1156	6 50 11	+55 17.7	9.1	7.6	33	9.02	*06*,00,07 .	9.02	00
	d h	1157	6 50 18	+55 12.9	9.2	0.0	56	9.74	*04*,00,05 .	9.74	00
	c .	1147	6 47 52	+55 35.6	9.2	2.9	55	9.76	. . A .	9.53	*23*
	e .	..	6 49 44	+55 33.4	..	..	70	10.22	. . A .	..	..
	f .	..	6 49 11	+55 35.1	..	..	92	10.80	. . A .	..	..
Lyra	β	3223	18 44 44	+33 12.2	var.	..	..	..	. . . . .	..	..
	γ .	3286	18 53 31	+32 29.2	3.2	15.31	..	3.30	A . . .	3.26	*04*
	μ .	2888	17 40 48	+27 48.0	3.5	10.20	..	3.48	A . . .	3.64	16
	o .	2925	18 1 54	+28 44.4	3.9	8.16	..	3.83	A . . .	3.78	*05*
	θ .	2982	17 51 18	+37 15.9	3.5	5.98	..	3.99	A . . .	3.98	*01*
	ε .	3509	18 39 32	+39 31.3	4.3	3.98	..	3.83	A . . .	4.10	*27*
		3510	18 39 34	+39 27.6	4.6						
	ζ .	3222	18 39 47	+37 27.7	4.5	2.24	..	4.06	A . . .	4.24	18
		3223	18 39 49	+37 26.8	5.5						
	δ .	3307	18 48 40	+36 47.4	6.1	1.34	..	4.15	A . . .	4.29	14
		3319	18 49 27	+36 43.1	4.5						
	κ .	3094	18 14 47	+36 0.1	4.7	0.17	..	4.34	A . . .	4.36	02
Monoceros	R	1427	6 31 15	+ 8 51.7	..	..	..	..	. . . . .	..	..
	c .	1429	6 31 21	+ 8 53.7	9.3	..	64	10.14	. . 01,00	..	..
	n .	..	6 31 24	+ 8 36	..	..	84	10.65	. . *01*,01	..	..
	b .	1424	6 30 52	+ 8 57.2	9.5	..	..	10.96	. . A .	..	..
	k .	..	6 31 26	+ 8 52	..	..	126	11.50	. . A .	..	..
	m .	..	6 31 0	+ 8 47	..	..	134	11.65	. . *01*,01	..	..
	l .	..	6 31 27	+ 9 6	..	..	..	..	. . . . .	..	..
Ophiuchus	R	4455	16 59 26	−15 54.2	..	..	..	..	. . . . .	..	..
	h b	4488	17 5 19	−15 22.9	7.0	20.9	..	6.74	*11*,10 . .	6.76	02

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Ophiuchus	g d	4436	17 3 7	−16 18.1	7.3	14.8	..	7.44	03,*03* . .	7.40	*04*
	f .	4753	17 5 57	−17 17.3	7.8	10.2	..	8.07	A . . .	7.91	*16*
	e g	4466	17 1 52	−15 58.5	8.0	7.6	0	8.19	*05*,*01*,05 .	8.24	05
	d h	4426	17 1 30	−16 6.9	8.0	3.4	3	8.58	04,00,*05* .	8.81	23
	c m	4420	16 58 47	−16 11.7	9.0	0.6	15	9.56	06,*03*,*03* .	9.40	*16*
Ophiuchus	S	4307	16 25 55	−16 51.1	..	..	..	..	. . . .	..	..
	m .	4315	16 28 40	−16 51.5	8.3	..	5	8.52	. . 00,00	..	..
	l .	4581	16 20 24	−17 8.6	8.8	..	..	9.09	. . . .	..	..
	h .	..	16 23 19	−16 50.0	..	30.7	..	11.93	. . . A	9.47	R
	g .	4308	16 26 17	−16 36.7	9.0	28.0	30	9.84	. . *01*,02	9.75	*09*
	f .	4303	16 23 55	−16 46.2	9.3	24.0	..	10.41	. . . A	10.22	*19*
	e .	..	16 26 46	−16 41.0	..	20.5	42	10.44	. . 04,*05*	10.68	24
	d .	4311	16 26 52	−16 50.4	9.5	17.2	49	10.92	. . *03*,02	11.17	25
	b .	..	16 26 27	−16 58.2	..	10.0	70	11.85	. . *05*,05	11.54	31
	a .	..	16 25 51	−16 47.8	8.0	..	92	12.30	. . 02,*02*	..	..
Orion	δ	983	5 24 37	− 0 24.6	..	..	..	..	. . . .	..	..
	x .	1235	5 40 53	− 9 44.2	2.5	..	..	2.20	A . . .	..	..
	b .	1162	5 0 43	− 5 16.3	3.0	..	..	2.92	A . . .	..	..
Orion	R	768	4 51 6	+ 7 54.2	..	..	..	..	. . . .	..	..
	m .	774	4 53 22	+ 7 39.5	8.3	22.9	0	8.72	. . *04*,05	8.72	00
	l .	817	4 50 14	+ 8 8.8	8.9	18.3	10	9.19	. . *01*,01	9.24	05
	h .	823	4 51 10	+ 8 11.1	9.2	15.0	21	9.67	. . 07,*07*	9.67	00
	g .	819	4 50 46	+ 8 6.6	9.5	12.7	25	9.96	. . A .	9.96	00
	c .	766	4 50 47	+ 7 42.9	9.5	8.9	35	10.53	. . A .	10.53	00
	a .	767	4 50 55	+ 7 50.3	9.5	4.9	48	11.24	. . 06,*06*	11.15	*09*
	b .	..	4 50 42	+ 7 52.6	..	0.0	61	12.11	. . *10*,10	12.11	00
Orion	S	1146	5 21 51	− 4 48.5	..	..	..	..	. . . .	..	..
	d .	1268	5 21 59	− 5 33.9	8.0	..	..	..	. . . .	..	..
	e .	1259	5 20 30	− 5 22.3	8.5	..	9	8.16	22 . 00,*21*	..	..
	f .	1155	5 23 57	− 4 56.0	8.7	..	12	8.45	17 . *12*,*05*	..	..
	h .	1285	5 25 38	− 5 4.2	8.7	..	..	8.64	*09* . . 09	..	..
	l .	1148	5 22 5	− 4 41.8	9.5	..	34	9.76	. . 12,*12*	..	..
	l′ .	1144	5 21 49	− 4 49.3	9.4	..	38	10.21	. . A .	..	..
Pegasus	R	5158	22 59 29	+ 9 43.0	..	..	..	..	. . . .	..	..
	α′ .	4973	22 51 14	+ 8 35.2	6.8	..	..	6.50	A . . .	..	..
	α .	5156	22 58 9	+ 9 39.5	8.0	25.0	0	7.36	06 . *06* .	7.26	*10*
	η e	4887	23 1 31	+10 9.6	7.0	20.9	0	7.39	12,*02*,*09* .	7.43	04
	ζ .	4894	23 3 11	+10 1.6	7.7	15.8	..	7.73	A . . .	7.76	03
	δ h	5164	23 1 3	+ 9 48.5	8.5	10.2	5	8.45	14,00,*25*,10	8.35	*10*
	y .	4885	23 0 24	+10 19.6	9.0	4.3	..	..	. . . .	9.14	..

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1885.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Pegasus	x .	4884	22 59 35	+10 16.6	9.3	0.6	. .	. .	. . . . .	9.65	. .
	c .	5159	22 59 37	+ 9 35.7	9.5	. .	. .	. .	. . . . .	. .	. .
	d .	. .	22 59 12	+ 9 50.2	. .	. .	28	10.74	. . A .	. .	. .
	s .	. .	22 58 51	+ 9 40.3	. .	. .	38	11.46	. . *03*,02	. .	. .
	b .	. .	22 59 13	+ 9 48.8	. .	. .	58	12.43	. . A .	. .	. .
Pegasus	S	. .	23 13 13	+ 8 7.6	. .	. .	. .	. .	. . . . .	. .	. .
	b c	5058	23 18 48	+ 8 7.6	7.3	50.7	0	7.54	12,05,*16* .	7.59	05
	c d	5039	23 10 43	+ 8 42.7	8.2	48.6	5	7.78	*11*,03,07 .	7.84	06
	d .	5029	23 7 45	+ 8 0.1	8.7	42.3	. .	. .	. . . . .	8.53	. .
	e .	5048	23 13 40	+ 8 50.9	8.6	39.9	. .	. .	. . . . .	8.80	. .
	f .	5041	23 11 37	+ 8 38.3	8.6	38.5	16	8.94	01 . *02* .	8.94	00
	g .	5037	23 10 36	+ 8 18.5	8.9	35.0	. .	. .	. . . . .	9.40	. .
	h m	5045	23 12 39	+ 8 1.7	9.3	30.8	30	9.92	. *20*,19 .	9.84	*08*
	k n	5046	23 13 5	+ 8 18.9	9.4	27.6	29	9.96	. *06*,07 .	10.22	26
	l .	5047	23 13 11	+ 8 32.5	9.5	22.9	40	10.74	. . A .	10.75	01
	m .	. .	23 13 12	+ 8 19.4	. .	19.0	50	11.16	. . A .	11.11	*05*
	n .	. .	23 13 9	+ 8 53	. .	16.0	. .	. .	. . . . .	11.35	. .
	o .	. .	23 13 9	+ 8 49	. .	12.6	. .	. .	. . . . .	11.62	. .
	p .	. .	23 13 28	+ 8 51	. .	8.6	. .	. .	. . . . .	11.89	. .
	q t	. .	23 14 3	+ 8 9	. .	2.1	. .	12.03	*05*,05 . .	12.32	29
	r u	. .	23 12 53	+ 8 16	. .	0.0	88	12.45	*03*,04,00 .	12.42	*03*
Pegasus	T	. .	22 1 49	+11 49.9	. .	. .	. .	. .	. . . . .	. .	. .
	h .	4736	22 1 27	+11 28.6	8.7	23.0	8	8.74	. . 00,00	8.75	01
	g .	4735	22 1 22	+11 47.6	8.9	19.2	16	9.25	. . *01*,01	9.22	*03*
	f .	4741	22 2 43	+11 44.7	9.5	15.1	22	9.56	. . 01,*02*	9.59	03
	d .	4733	22 0 51	+11 53.6	9.5	6.7	37	10.46	. . *06*,05	10.45	*01*
	c .	. .	22 0 24	+11 50.3	. .	2.5	60	11.55	. . A .	11.06	*49*
	b .	. .	22 2 38	+11 47	10.5	0.0	58	11.52	. . *02*,01	11.60	08
	a .	. .	22 2 20	+11 52	10	. .	57	11.59	. . *14*,14	. .	. .
Perseus	β	673	2 58 44	+40 24.5	. .	. .	. .	. .	. . . . .	. .	. .
	c .	395	1 55 2	+41 37.6	2.0	22.1	. .	2.20	A . . .	2.31	11
	i .	855	4 47 33	+32 56.2	3.0	16.1	. .	2.90	A . . .	2.67	*23*
	h .	306	1 46 38	+20 5.8	2.5	16.1	. .	2.72	A . . .	2.67	*05*
	ε .	895	3 48 9	+39 35.4	3.2	12.4	. .	2.96	A . . .	2.91	*05*
	γ .	654	2 54 20	+52 56.0	3.2	10.9	. .	3.08	A . . .	3.00	*08*
	b .	381	2 0 57	+34 18.0	3.0	8.9	. .	3.08	A . . .	3.13	05
	δ .	876	3 32 37	+47 19.6	3.5	7.8	. .	3.10	A . . .	3.21	11
	a .	312	1 44 50	+28 52.5	3.9	4.0	. .	3.58	A . . .	3.53	*05*
	ν .	815	3 35 22	+42 7.6	4.1	1.5	. .	3.93	A . . .	3.84	*09*
Perseus	ρ	630	2 55 54	+38 16.8	. .	. .	. .	. .	. . . . .	. .	. .
	b .	381	2 0 57	+34 18.0	3.0	8.9	. .	3.08	A . . .	3.02	*06*

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Perseus	δ .	876	3 32 37	+47 19.6	3.5	7.8	. .	3.10	A . . .	3.13	03
	a .	312	1 44 50	+28 52.5	3.9	4.0	. .	3.58	A . . .	3.58	00
	ο .	642	3 35 16	+31 49.6	3.8	2.1	. .	3.94	A . . .	3.79	*15*
	ν .	815	3 35 22	+42 7.6	4.1	1.5	. .	3.93	A . . .	3.88	*05*
	κ .	631	2 59 45	+44 17.9	4.5	0.0	. .	4.00	A . . .	4.05	05
Perseus	R	. .	3 20 50	+35 10.0	. .	. .	. .	. .	. . . . .	. .	. .
	l .	698	3 20 55	+36 8.1	7.2	48.7	. .	7.79	A . . .	7.92	13
	k .	703	3 20 57	+35 43.5	8.2	42.6	. .	8.47	A . . .	8.36	*11*
	h .	639	3 15 9	+34 58.7	8.0	39.0	. .	8.67	A . . .	8.63	*04*
	g .	706	3 21 12	+35 43.5	8.6	36.1	. .	. .	. . . . .	8.86	. .
	f .	698	3 19 38	+35 11.3	8.8	34.3	41	9.01	*01* . 00,00	9.01	00
	e .	699	3 19 41	+35 41.7	8.8	31.3	. .	9.27	A . . .	9.28	01
	d .	701	3 20 5	+35 10.3	9.1	28.7	53	9.52	. . 01,*01*	9.57	05
	c′ .	705	3 21 8	+35 16.6	9.3	25.0	67	10.10	. . 03,*04*	10.03	*07*
	c .	707	3 21 30	+35 11.7	9.4	21.8	73	10.36	. . 00,*01*	10.44	08
	b .	. .	3 20 47	+35 15.3	. .	14.9	118	11.98	. . 13,*13*	11.52	*46*
	a .	. .	3 21 3	+35 8.8	12.6	10.0	128	12.27	. . 07,*07*	12.44	17
Perseus	S	552	2 12 32	+57 54.9	. .	. .	. .	. .	. . . . .	. .	. .
	c .	566	2 15 3	+57 31.4	8.1	. .	8	7.83	*04* . 04 .	. .	. .
	d .	452	2 11 16	+58 6.7	8.7	. .	16	8.22	07 . *06* .	. .	. .
	e .	559	2 11 25	+57 54.1	8.5	. .	23	8.41	. . A .	. .	. .
	f .	457	2 12 54	+58 9.7	8.6	. .	31	8.70	*01* . 02 .	. .	. .
	g .	546	2 10 52	+57 49.3	9.3	. .	41	9.08	. . A .	. .	. .
Pisces	R	222	1 23 9	+ 2 8.0	. .	. .	. .	. .	. . . . .	. .	. .
	c′ b	207	1 18 2	+ 2 12.1	7.5	26.9	. .	6.89	07,*07* . .	6.91	02
	c d	227	1 24 45	+ 2 56.3	7.8	22.4	0	7.67	14,*08*,*06*,00	7.56	*11*
	b e	229	1 25 16	+ 2 17.5	8.3	17.7	5	8.05	02,*07*,05 .	8.15	10
	a h	221	1 23 0	+ 2 12.4	8.8	13.2	12	8.72	*03*,00,04 .	8.63	*09*
	d k	271	1 24 10	+ 1 50.6	8.8	9.3	12	8.92	12,03,*16* .	9.04	12
	e l	224	1 23 43	+ 2 8.3	9.0	6.3	18	9.29	05,*04*,00 .	9.31	02
	f .	217	1 21 37	+ 2 51.0	8.7	. .	. .	9.17	A . . .	. .	. .
	g m	216	1 21 3	+ 2 52.7	8.8	. .	. .	9.30	*08*,07 . .	. .	. .
	h .	. .	1 23 5	+ 1 51.0	. .	. .	34	11.23	. . A .	. .	. .
	m x	. .	1 23 17	+ 2 8.7	10.0	. .	82	13.14	. *01*,02 .	. .	. .
Pisces	S	203	1 10 0	+ 8 10.0	. .	. .	. .	. .	. . . . .	. .	. .
	b .	197	1 11 54	+ 7 36.4	8.2	25.1	0	8.01	*02* . 01,00	8.03	02
	d′ .	200	1 8 53	+ 8 52.2	8.5	19.6	. .	. .	. . . . .	8.60	. .
	d .	192	1 9 20	+ 7 43.8	9.1	15.2	14	9.16	*04* . 03,02	9.06	*10*
	n .	202	1 9 36	+ 8 7.7	9.3	12.9	19	9.58	. . 00,*01*	9.31	*27*
	h .	190	1 7 6	+ 8 1.5	9.0	11.3	. .	. .	. . . . .	9.49	. .

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Pisces	f .	193	1 7 30	+ 8 1.0	9.2	9.1	..	..	. . . . .	9.74	..
	t .	205	1 10 39	+ 8 10.3	9.5	3.6	30	10.31	. . 04,*04*	10.41	10
	u .	204	1 10 31	+ 8 16.4	9.5	2.0	31	10.47	. . *05*,05	10.60	13
	z .	..	1 10 30	+ 7 57.8	..	..	..	11.22	. . . A	..	..
	s .	..	1 10 14	+ 8 7.9	..	*6.6*	56	12.03	. . 07,*07*	12.00	*03*
	p .	..	1 10 0	+ 8 10.8	..	..	74	13.27	. . A .	..	..
Pisces	T	63	0 24 29	+13 48.0	..	..	..	..	. . . . .	..	..
	a .	65	0 25 6	+13 29.7	9.5	19.1	35	10.38	. . 12,*12*	10.36	*02*
	b .	64	0 24 53	+13 47.8	9.5	14.7	39	10.79	. . A .	10.82	03
	c .	68	0 25 36	+13 41.8	9.5	14.0	42	10.99	. . A .	10.90	*09*
	d .	67	0 25 28	+13 49.0	9.5	11.8	46	11.18	. . 10,*09*	11.15	*03*
	h .	60	0 23 15	+13 44.5	9.5	10.0	47	11.35	. . A .	11.40	05
	e .	71	0 26 0	+13 53.8	9.5	8.0	50	11.55	. . A .	11.66	11
	i .	..	0 24 15	+13 55.0	..	6.8	54	11.96	. . *16*,16	11.83	*13*
	k .	..	0 23 59	+14 3.8	..	6.0	59	12.08	. . A .	11.94	*14*
	m .	..	0 25 13	+13 57.6	..	1.8	65	12.44	. . *01*,01	12.51	07
Sagitta	R	4197	20 7 27	+16 17.4	..	..	..	..	. . . . .	..	..
	h .	4099	20 7 16	+15 59.3	8.5	30.7	45	8.46	*05* . 04 .	8.47	01
	g .	4192	20 7 3	+16 10.0	8.7	26.9	53	8.75	26 . *05*,*21*	8.73	*02*
	f .	4203	20 8 15	+16 20.3	9.2	23.0	68	9.11	23 . *01*,*23*	9.02	*09*
	e .	4193	20 7 18	+16 32.4	9.4	19.5	73	9.40	. . A .	9.27	*13*
	d .	4200	20 7 46	+16 17.9	9.3	16.6	70	9.14	. . 06,*07*	9.44	30
	c .	4195	20 7 21	+16 33.2	9.4	13.5	81	9.70	. . 10,*09*	9.60	*10*
	b .	..	20 8 53	+16 16.1	..	10.0	79	9.60	. . A .	9.75	15
	a .	4191	20 7 2	+16 17.5	9.5	..	94	10.28	. . *08*,08	..	..
Sagittarius	R	5367	19 8 12	−19 33.7	..	..	..	..	. . . . .	..	..
	q a	5412	19 13 8	−19 30.0	6.5	..	..	6.36	02,*02* . .	..	..
	p c	5387	19 9 43	−19 7.0	8.0	..	0	6.94	*12*,12,00 .	..	..
	n .	5398	19 11 30	−19 37.5	8.0	..	4	7.29	. . A .	..	..
	m′.	5388	19 9 50	−19 37.0	8.5	..	9	7.86	13 . *14* .	..	..
	m h	5378	19 9 2	−19 18.9	9.0	..	16	8.35	. 04,*04* .	..	..
	g .	5386	19 9 34	−19 23.8	8.5	..	18	8.47	. . A .	..	..
	f l	5369	19 8 29	−19 18.8	9.3	..	29	9.02	. *26*,26 .	..	..
	A q	5365	19 8 9	−19 37.0	9.9	..	42	10.22	09,01,*10* .	..	..
Sagittarius	S	5394	19 10 57	−19 17.0	..	..	..	..	. . . . .	..	..
	d .	5390	19 10 2	−19 19.6	9.2	..	24	9.26	*43* . 25,17	..	..
	c .	5389	19 9 53	−19 19.4	9.6	..	38	10.24	. . 16,*17*	..	..
	b .	..	19 11 17	−19 18.1	..	..	67	12.22	. . 04,*04*	..	..
	m .	..	19 10 38	−19 19.1	..	..	74	12.68	. . *01*,00	..	..
	n .	..	19 10 36	−19 18.1	..	..	78	12.95	. . *07*,07	..	..
	a .	..	19 9 53	−19 16.4	..	..	..	..	. . . . .	..	..

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Sagittarius	T	5546	19 7 52	−17 13.2	. .	. .	. .	. .	. . . . .	. .	. .
	p .	5588	19 12 10	−17 18.3	8.1	30.9	. .	. .	. . . . .	7.55	. .
	n .	5564	19 9 29	−17 10.6	7.8	26.2	7	7.85	. . 03,*03*	7.90	05
	m .	5555	19 8 39	−17 18.0	8.2	23.1	11	8.26	. . *01*,02	8.14	*12*
	k .	5540	19 7 12	−17 6.6	8.8	18.3	17	8.66	. . 06,*05*	8.58	*08*
	h .	5570	19 9 56	−17 15.4	8.7	15.1	. .	. .	. . . . .	8.89	. .
	h′ .	5571	19 10 0	−17 19.6	8.3	15.0	. .	. .	. . . . .	8.90	. .
	g .	5543	19 7 39	−17 36.3	9.0	11.5	22	9.16	. . *07*,06	9.26	10
	f .	5556	19 8 43	−17 22.7	9.3	7.8	30	9.64	. . 05,*05*	9.68	04
	e .	. .	19 8 17	−17 20.0	. .	3.6	41	10.53	. . A .	10.33	*20*
	d .	. .	19 8 3	−17 13.0	. .	0.0	45	10.96	. . *11*,11	11.02	06
	a .	. .	19 8 9	−17 16.8	. .	. .	70	. .	. . . . .	. .	. .
Sagittarius	U	5047	18 23 21	−19 13.2	. .	. .	. .	. .	. . . . .	. .	. .
Sagittarius	V	4987	18 22 54	−18 21.5	. .	. .	. .	. .	. . . . .	. .	. .
Scorpius	R	4140	16 9 1	−22 35.0	. .	. .	. .	. .	. . . . .	. .	. .
	S	4141	16 9 2	−22 32.0	. .	. .	. .	. .	. . . . .	. .	. .
	d .	4146	16 9 37	−22 47.0	9.2	28.0	30	9.88	. . A .	9.74	*14*
	c .	4144	16 9 10	−22 32.2	9.2	25.8	33	10.09	. . A .	9.99	*10*
	a o	4139	16 8 53	−22 42.5	9.2	22.7	36	10.18	*10*,*02*,12 .	10.34	16
	e p	4138	16 8 49	−22 50.7	9.3	. .	. .	10.48	*02* . 03 .	. .	. .
	w s	. .	16 8 15	−22 27.8	. .	18.5	45	10.94	08 . *08* .	10.89	*05*
	x w	. .	16 7 43	−22 29.7	. .	14.1	. .	11.87	. A . .	11.51	*36*
	x′ .	. .	16 7 42	−22 32.1	. .	9.9	. .	. .	. . . . .	12,09	. .
	y .	. .	16 8 48	−22 28.3	. .	6.0	76	12.32	. . *03*,02	12.61	29
	f .	. .	16 10 14	−22 29.9	. .	. .	. .	. .	. . . . .	. .	. .
Scutum	R	4760	18 39 45	− 5 51.1	. .	. .	. .	. .	. . . . .	. .	. .
	k′ .	4840	18 53 56	− 5 56.4	4.7	. .	. .	4.15	A . . .	. .	. .
	k c	4976	18 49 18	− 6 1.8	5.0	. .	. .	5.00	04,*03* . .	. .	. .
	g e	4460	18 55 16	− 3 54.5	5.7	. .	. .	5.60	*05*,05 . .	. .	. .
	h .	4684	18 57 18	− 4 14.4	5.7	. .	. .	5.53	A . . .	. .	. .
	c f	4922	18 41 55	− 6 4.1	6.8	. .	. .	6.18	04,*05* . .	. .	. .
	b g	4913	18 40 54	− 6 9.2	7.2	. .	. .	6.64	*11*,10 . .	. .	. .
	a′ .	4869	18 36 53	− 6 40.2	7.0	. .	. .	7.02	A . . .	. .	. .
	a h	4897	18 39 24	− 6 2.8	7.0	. .	. .	7.08	00,*01* . .	. .	. .
	d l	4736	18 35 39	− 5 50.0	7.8	. .	. .	7.74	12,*11* . .	. .	. .
	m n	4745	18 37 22	− 5 38.6	8.3	. .	. .	8.31	00,00 . .	. .	. .
Serpens	R	2918	15 44 1	+15 32.7	. .	. .	. .	. .	. . . . .	. .	. .
	φ .	2969	15 50 33	+14 50.1	6.0	44.9	. .	5.66	A . . .	5.56	*10*
	υ .	2939	15 40 33	+14 34.5	6.0	42.4	. .	5.72	A . . .	5.74	02
	e .	2840	15 46 58	+16 30.6	7.2	37.3	. .	6.14	A . . .	6.16	02
	R .	2926	15 46 23	+17 50.7	6.7	. .	. .	6.44	A . . .	. .	. .

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Serpens	d′ .	2913	15 39 44	+15 59.1	7.1	31.8	0	6.70	08 . *07* .	6.73	03
	c .	2923	15 45 22	+15 39.7	8.0	27.0	7	7.38	*11* . 11,*01*	7.25	*13*
	d .	2925	15 46 18	+15 52.5	7.5	25.7	7	7.53	09 . *04,05*	7.36	*17*
	t .	2951	15 44 49	+14 21.0	7.8	22.0	. .	7.67	A . . .	7.77	10
	b .	2933	15 49 34	+15 10.5	8.1	18.6	. .	8.07	A . . .	8.10	03
	g .	2835	15 44 32	+16 35.1	8.7	14.8	. .	8.51	A . . .	8.46	*05*
	r .	2921	15 45 14	+15 17.4	8.5	11.7	17	8.44	. . *02*,01	8.78	34
	f .	2916	15 41 33	+15 51.3	9.0	7.9	. .	9.14	A . . .	9.13	*01*
	p .	2922	15 45 21	+15 29.3	9.0	4.7	29	9.45	21 . *24*,03	9.47	02
	w .	. .	15 45 10	+14 24	9.3	0.0	. .	10.06	. . . A	9.96	*10*
Serpens	S	2864	15 14 52	+14 49.3	. .	. .	. .	. .	. . . . .	. .	. .
	b b	2845	15 13 20	+15 4.6	7.3	. .	0	7.64	09,*04,04* .	. .	. .
	a d	2866	15 16 33	+14 33.6	7.9	. .	9	8.39	05,*01,04* .	. .	. .
	c f	2868	15 17 33	+14 36.3	8.5	. .	18	8.96	08,*06,01* .	. .	. .
	c′ .	2870	15 18 26	+14 20.2	9.1	. .	. .	. .	. . . . .	. .	. .
	d l	2862	15 14 17	+14 41.8	9.3	. .	37	10.12	09,*04,04* .	. .	. .
	f .	2865	15 15 29	+14 13.2	9.5	. .	. .	. .	. . . . .	. .	. .
	g o	. .	15 14 11	+15 6	. .	. .	54	11.05	. 19,*19* .	. .	. .
	k .	. .	15 14 22	+14 47.5	. .	. .	75	11.61	. . A .	. .	. .
	h q	. .	15 14 44	+14 50.8	. .	. .	76	11.70	. 05,*05* .	. .	. .
	l r	. .	15 15 8	+14 45	. .	. .	91	12.06	. 00,*01* .	. .	. .
	m .	. .	15 15 38	+14 49	. .	. .	. .	. .	. . . . .	. .	. .
Serpens	T	. .	18 21 44	+ 6 12.5	. .	. .	. .	. .	. . . . .	. .	. .
	k .	3799	18 21 19	+ 6 19.5	9.0	. .	25	8.56	. . 00,00	. .	. .
	h′ .	3776	18 20 22	+ 6 9.5	9.2	. .	38	9.44	. . 00,*01*	. .	. .
	h .	3807	18 22 3	+ 6 13.2	9.3	. .	40	9.62	. . *03*,02	. .	. .
	g .	3805	18 21 40	+ 6 4.3	9.5	. .	46	9.96	. . 00,*01*	. .	. .
	f .	. .	18 21 19	+ 6 16.5	. .	. .	58	10.62	. . 02,*03*	. .	. .
	e .	3808	18 22 3	+ 6 12.1	9.5	. .	76	11.66	. . *05*,04	. .	. .
	d .	. .	18 22 12	+ 6 12.3	. .	. .	82	11.91	. . A .	. .	. .
	c .	. .	18 22 1	+ 6 14.8	. .	. .	89	12.22	. . 03,*03*	. .	. .
Taurus	λ	539	3 52 40	+12 4.9	. .	. .	. .	. .	. . . . .	. .	. .
	c .	422	2 35 50	+ 2 38.2	3.5	. .	. .	3.58	A . . .	. .	. .
	ξ .	439	3 19 19	+ 9 13.7	4.0	. .	. .	3.75	A . . .	. .	. .
	o .	511	3 17 1	+ 8 30.9	3.8	. .	. .	3.80	A . . .	. .	. .
	γ .	612	4 11 32	+15 17.3	3.8	. .	. .	3.86	A . . .	. .	. .
	ν .	581	3 55 27	+ 5 35.2	4.0	. .	. .	3.94	A . . .	. .	. .
	π .	697	4 18 27	+14 24.3	5.0	. .	. .	4.94	A . . .	. .	. .
Taurus	o	511	3 17 1	+ 8 30.9	3.8	. .	. .	3.80	A . . .	. .	. .
	c .	422	2 35 50	+ 2 38.2	3.5	. .	. .	3.58	A . . .	. .	. .
	ξ .	439	3 19 19	+ 9 13.7	4.0	. .	. .	3.75	A . . .	. .	. .

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Taurus	γ .	632	4 11 32	+15 17.3	3.8	. .	. .	3.86	A . . .	. .	. .
	λ .	539	3 52 40	+12 4.9	. .	. .	. .	. .	A . . .	. .	. .
	π .	697	4 18 27	+14 24.3	5.0	. .	. .	4.94	A . . .	. .	. .
Taurus	R	585	4 20 21	+ 9 50.2	. .	. .	. .	. .	. . . . .	. .	. .
	a′ d	588	4 22 58	+10 25.7	7.8	49.5	. .	7.14	*02*,02 . .	7.07	*07*
	a e	584	4 20 6	+ 9 44.5	7.8	45.0	12	7.46	*02*,03,00 .	7.48	02
	b g	583	4 19 55	+ 9 40.6	8.3	39.0	20	8.14	*01*,02,*02* .	8.13	*01*
	p .	586	4 22 41	+10 17.0	9.0	34.2	. .	8.69	A . . .	8.70	01
	c .	584	4 22 25	+10 8.9	9.4	29.6	. .	9.59	A . . .	9.30	*29*
	d .	589	4 23 3	+10 5.7	9.2	27.6	. .	. .	. . . . .	9.55	. .
	e .	581	4 19 52	+ 9 58.3	9.4	22.8	45	10.00	. . A .	10.15	15
	l .	. .	4 20 41	+ 9 40.5	. .	16.0	. .	. .	. . . . .	11.04	. .
	m .	. .	4 20 26	+ 9 52.2	. .	10.0	69	11.79	. . A .	11.80	01
Taurus	S	586	4 21 16	+ 9 37.2	. .	. .	. .	. .	. . . . .	. .	. .
	k .	588	4 21 33	+ 9 32.2	9.5	. .	49	10.31	. . A .	. .	. .
	b .	. .	4 20 53	+ 9 28.7	. .	. .	62	11.28	. . A .	. .	. .
	x .	. .	4 21 10	+ 9 33.7	. .	. .	63	11.35	. . A .	. .	. .
	a .	. .	4 20 46	+ 9 26.6	. .	. .	70	11.86	. . A .	. .	. .
Taurus	T	. .	4 13 33	+19 11.3	. .	. .	. .	. .	. . . . .	. .	. .
	d . .	701	4 11 51	+19 16.1	9.3	. .	41	9.84	. . *01*,00	. .	. .
	c .	700	4 11 27	+19 10.0	9.4	. .	. .	10.08	. . . A	. .	. .
	b .	. .	4 12 41	+19 15.0	. .	. .	51	10.68	. . *14*,13	. .	. .
	a .	. .	4 12 25	+19 9.9	. .	. .	60	11.10	. . 06,*07*	. .	. .
	m .	. .	4 12 14	+19 6	. .	. .	. .	11.69	. . . A	. .	. .
	n .	. .	4 11 37	+19 10.7	. .	. .	. .	12.44	. . . A	. .	. .
	o .	. .	4 13 52	+19 16	. .	. .	93	13.44	. . . A	. .	. .
Taurus	V	. .	4 43 39	+17 17.4	. .	. .	. .	. .	. . . . .	. .	. .
	m .	. .	. . . . . .	. . . .	. .	. .	. .	40.7	. . . . .	. .	. .
	l .	. .	. . . . . .	. . . .	. .	. .	. .	37.9	. . . . .	. .	. .
	k .	. .	. . . . . .	. . . .	. .	. .	. .	35.3	. . . . .	. .	. .
	h .	. .	. . . . . .	. . . .	. .	. .	. .	30.8	. . . . .	. .	. .
	g .	. .	. . . . . .	. . . .	. .	. .	. .	27.5	. . . . .	. .	. .
	f .	. .	. . . . . .	. . . .	. .	. .	. .	25.3	. . . . .	. .	. .
	e .	. .	. . . . . .	. . . .	. .	. .	. .	20.6	. . . . .	. .	. .
	d .	. .	. . . . . .	. . . .	. .	. .	. .	18.3	. . . . .	. .	. .
	c .	. .	. . . . . .	. . . .	. .	. .	. .	16.0	. . . . .	. .	. .
	b .	. .	. . . . . .	. . . .	. .	. .	. .	10.0	. . . . .	. .	. .
	a .	. .	. . . . . .	. . . .	. .	. .	. .	5.2	. . . . .	. .	. .
	a′ .	. .	. . . . . .	. . . .	. .	. .	. .	2.2	. . . . .	. .	. .
Ursa Major	R	587	10 34 19	+69 32.1	. .	. .	. .	. .	. . . . .	. .	. .

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Ursa Major	i′ b	617	10 34 57	+68 10.2	6.2	45.0	. .	6.26	06,*05* . .	6.11	*15*
	h c	803	10 39 6	+65 53.7	6.5	35.2	. .	6.33	*09*,09 . .	6.69	36
	i d	645	10 53 40	+70 48.9	6.3	40.0	. .	6.68	*03*,02 . .	6.40	*28*
	m e	561	9 58 4	+69 23.0	7.0	23.0	. .	7.17	09,*09* . .	7.55	38
	g .	681	10 37 49	+66 21.5	7.9	28.7	. .	7.21	A . . .	7.12	*09*
	e .	641	10 49 4	+70 46.4	7.1	25.4	. .	7.37	A . . .	7.36	*01*
	k .	682	10 37 58	+66 12.7	7.8	23.5	. .	7.58	A . . .	7.51	*07*
	d g	577	10 24 13	+69 27.1	7.7	20.3	. .	7.74	03,*03* . .	7.78	04
	e′ .	640	10 48 46	+70 35.2	7.8	19.5	. .	8.01	A . . .	7.85	*16*
	c h	584	10 32 5	+69 22.4	8.3	16.3	14	8.25	*17*,*07* 24 .	8.19	*06*
	l .	622	10 32 17	+70 16.0	8.3	14.2	. .	8.44	A . . .	8.40	*04*
	b l	592	10 46 31	+69 20.4	8.6	9.5	. .	8.86	06,*06* . .	8.95	09
	a .	591	10 41 37	+69 45.0	9.5	5.0	. .	. .	. . . .	. .	. .
	a′ p	590	10 37 19	+69 23.4	9.5	0.0	43	10.42	08,04,*13* .	10.42	00
Ursa Major	S	1313	12 37 35	+61 53.3	. .	. .	. .	. .	. . . .	. .	. .
	p b	1309	12 33 7	+61 41.1	7.0	39.4	13	7.04	06,*02*,*05* .	7.13	09
	i c	1307	12 32 29	+61 49.0	7.2	36.5	29	7.42	*04*,*12*,15 .	7.38	*04*
	g e	1416	12 33 52	+60 19.6	8.2	32.1	0	7.98	*11*,*05*,02,15	7.79	*19*
	n .	1315	12 38 16	+61 17.5	9.2	26.7	56	8.49	. . A .	8.31	*18*
	k .	1254	12 42 2	+62 38.4	8.3	24.5	. .	8.48	A . . .	8.52	04
	l f	1310	12 34 25	+61 36.6	8.5	22.0	51	8.41	*01*,09,*08* .	8.77	36
	m g	1311	12 35 29	+61 40.2	9.2	18.6	66	8.82	*01*,01,*01* .	9.16	34
	o l	1318	12 39 42	+61 55.8	9.5	12.0	118	10.12	*02*,*03*,05 .	10.03	*09*
	r n	. .	12 38 47	+61 58.2	. .	5.0	182	11.08	*15*,00,16 .	10.96	*12*
	q m	. .	12 38 43	+61 49.5	. .	. .	139	10.64	10,01,*12* .	. .	. .
	s .	. .	12 40 6	+61 57.0	. .	2.3	178	11.18	. . A .	11.35	17
	t o	. .	12 39 14	+61 49.2	. .	0.4	217	11.73	*01*,*15*,16 .	11.66	*07*
Ursa Major	T	1406	12 29 46	+60 17.2	. .	. .	. .	. .	. . . .	. .	. .
	p b	1309	12 33 7	+61 41.1	7.0	39.4	13	7.04	06,*02*,*05* .	7.08	04
	i c	1307	12 32 29	+61 49.0	7.2	36.5	29	7.42	*04*,*12*,15 .	7.43	01
	g e	1416	12 33 52	+60 19.6	8.2	32.1	0	7.98	*11*,*05*,02,15	7.88	*10*
	h f	1413	12 32 43	+60 32.9	8.3	26.3	6	8.32	*02*,02,00,*02*	8.82	50
	β k	1411	12 31 55	+60 29.6	9.2	22.8	37	9.85	*05*,00,*03*,07	9.60	*25*
	γ .	. .	12 31 37	+60 3.6	. .	21.5	48	10.42	. . *13*,14	9.96	*46*
	δ m	1412	12 32 15	+60 18.6	9.5	17.3	53	10.71	. 04,*21*,17	10.87	16
	ε .	. .	12 31 52	+60 12	. .	12.6	. .	. .	. . . .	11.66	. .
	ζ q	. .	12 29 10	+60 19	. .	8.8	95	12.30	01,*04*,*19*,21	12.30	00
	η .	. .	12 31 0	+60 17	. .	5.0	. .	. .	. . . .	12.85	. .
	n′ .	. .	12 31 58	+60 35.6	. .	. .	. .	. .	. . . .	. .	. .
Virgo	R	2561	12 31 9	+ 7 47.7	. .	. .	. .	. .	. . . .	. .	. .
	f b	2609	12 23 60	+ 8 23.7	6.5	. .	10	6.10	06,*06*,00 .	. .	. .
	t c	2648	12 29 48	+ 9 36.3	7.0	. .	. .	6.56	06,*07* . .	. .	. .

Constellation.	Des.	DM.	R.A 1855..	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Virgo	e d	2619	12 27 9	+ 8 31.6	7.1	. .	32	6.91	*06*,*04*,09 .	. .	. .
	k e	2617	12 26 13	+ 8 28.4	7.1	. .	38	7.08	*14*,01,12 .	. .	. .
	i f	2616	12 26 4	+ 8 44.9	7.5	. .	43	7.58	00,*02*,02 .	. .	. .
	b .	2634	12 34 56	+ 8 50.8	8.0	. .	54	8.06	*29* . 04,36	. .	. .
	a .	2628	12 33 14	+ 8 30.3	8.5	. .	. .	. .	. . . . .	. .	. .
	l .	2644	12 34 27	+ 6 39.1	8.7	. .	. .	. .	. . . . .	. .	. .
	c′ .	2570	12 36 4	+ 7 14.7	9.0	. .	. .	. .	. . . . .	. .	. .
	h m	2558	12 29 58	+ 7 39.1	9.1	. .	97	9.26	*03*,08,04,*07*	. .	. .
	g n	2562	12 32 20	+ 7 52.2	9.3	. .	103	9.61	. 01,*01*,01	. .	. .
	m p	2560	12 30 35	+ 7 58.1	9.5	. .	133	10.34	*10*,*13*,16,08	. .	. .
	g′ .	2564	12 32 31	+ 7 56.6	9.5	. .	133	10.48	. . *08*,08	. .	. .
	n .	. .	12 29 38	+ 7 34.5	. .	. .	154	11.20	. . A .	. .	. .
	p .	. .	12 30 45	+ 7 54.7	. .	. .	173	11.83	. . *03*,03	. .	. .
Virgo	S	3837	13 25 26	− 6 26.9	. .	. .	. .	. .	. . . . .	. .	. .
	n c	3706	13 22 53	− 5 43.3	6.6	40.1	0	6.05	02,03,*06* .	6.04	*01*
	a d	3839	13 25 50	− 6 52.7	7.0	32.1	7	6.96	12,*02*,*10* .	6.77	*19*
	m .	3661	13 29 60	− 7 7.7	7.7	28.7	. .	7.11	A . . .	7.06	*05*
	b e	3643	13 26 42	− 7 52.5	7.0	25.6	. .	7.35	03,*03* . .	7.28	*07*
	c .	3730	13 28 10	− 5 24.9	8.0	. .	. .	. .	. . . . .	. .	. .
	d .	3843	13 27 30	− 6 13.3	8.1	16.2	15	7.83	. . A .	8.01	18
	e h	3834	13 24 45	− 6 41.1	8.5	11.6	21	8.43	*10*,*01*,11 .	8.43	00
	f k	3635	13 23 56	− 7 15.2	8.2	9.3	. .	8.66	03,*03* . .	8.66	00
	g .	. .	13 24 30	− 6 48	. .	6.7	. .	. .	. . . . .	. .	. .
	h l	3840	13 26 16	− 6 32.1	9.1	4.8	26	9.26	13,*25*,*15*,29	9.20	*06*
	k .	3836	13 25 2	− 6 34.1	9.1	1.0	30	9.57	. . A .	9.59	02
	x .	. .	13 24 53	− 6 30.5	. .	. .	39	10.49	. . A .	. .	. .
	w .	. .	13 25 2	− 6 42	. .	. .	43	10.82	. . A .	. .	. .
	y .	. .	13 24 45	− 6 29.9	. .	. .	. .	. .	. . . . .	. .	. .
Virgo	T	3456	12 7 10	− 5 13.8	. .	. .	. .	. .	. . . . .	. .	. .
	g g	3457	12 7 12	− 5 52.6	8.8	. .	. .	8.86	*05*,04 . .	. .	. .
	f′ .	3455	12 6 52	− 5 50.7	9.1	. .	. .	. .	. . . . .	. .	. .
	f k	3453	12 6 23	− 5 41.4	9.1	35.6	33	9.63	*18*,*02*,19 .	9.66	03
	e .	3458	12 7 38	− 5 1.9	9.5	30.5	40	10.34	. . A .	10.32	*02*
	c .	3460	12 8 13	− 5 11.9	10.0	25.5	47	10.80	. . A .	10.81	01
	k .	. .	12 7 35	− 5 11	. .	20.2	. .	. .	. . . . .	11.38	. .
	l p	. .	12 7 3	− 5 11	. .	16.6	62	11.77	03,04,*08* .	11.75	*02*
Virgo	U	2664	12 43 44	+ 6 20.5	. .	. .	. .	. .	. . . . .	. .	. .
	f .	2673	12 47 55	+ 6 5.6	8.0	45.0	. .	7.68	A . . .	7.66	*02*
	e e	2588	12 46 37	+ 7 32.3	8.2	38.9	. .	8.19	04,*04* . .	8.14	*05*
	d .	2671	12 46 58	+ 6 58.8	8.7	34.4	. .	8.58	A . . .	8.53	*05*
	c h	2672	12 47 5	+ 6 19.4	8.8	30.2	. .	8.98	00,00 . .	8.95	*03*
	b l	2666	12 44 27	+ 6 8.7	9.0	26.3	29	8.24	14,02,*17* .	9.35	11

Constellation.	Des.	DM.	R. A. 1855.	Dec. 1855.	DM.	Sch.	Hagen.	Magn.	Residual.	Sch.	Res.
			h. m. s.	° ′							
Virgo	m n	2685	12 43 35	+ 5 56.7	9.4	22.8	39	9.66	*16,16*,01,29	9.72	06
	a o	2665	12 43 53	+ 6 13.3	9.5	18.0	49	10.20	. *12*,11 .	10.32	12
	n p	..	12 43 35	+ 6 19.1	..	16.7	51	10.45	04,*01,02* .	10.51	06
	p .	..	12 44 7	+ 6 20.8	..	13.4	65	11.27	. . *12*,12	11.11	*16*
	q s	..	12 44 31	+ 6 18.9	..	9.2	79	11.81	. *29,08*,38	11.79	*02*
	r u	..	12 43 28	+ 6 11.5	..	5.0	89	12.34	*14,17,33*,66	12.34	00
	s x	..	12 43 46	+ 6 24.5	..	1.6	..	12.83	. A . .	12.83	00
Virgo	V	3686	13 20 19	− 2 25.1	..	..	..	..	. . . .	..	..
	e .	3683	13 18 33	− 2 37.4	R	..	..	..	. . . .	..	..
	k e	3476	13 21 12	− 3 42.7	8.0	38.2	..	8.21	*05,05* . 11	8.29	08
	h g	3698	13 23 33	− 2 3.9	8.5	33.5	..	8.71	12,*12* . .	8.78	07
	g k	3689	13 21 49	− 2 12.6	9.0	29.2	18	9.32	*09,04*,12 .	9.26	*06*
	d .	3690	13 22 4	− 2 18.9	9.5	21.0	24	10.14	. . A .	10.12	*02*
	c .	..	13 23 0	− 2 28	..	19.0	..	..	. . . .	10.35	..
	b .	..	13 21 4	− 2 53	..	17.0	..	..	. . . .	10.61	..
	a .	..	13 20 9	− 2 43	..	13.7	..	..	. . . .	10.95	..
	a′ .	..	13 22 17	− 2 33.5	..	10.0	..	..	. . . .	11.37	..
Vulpecula	R	4230	20 57 56	+23 14.9	..	..	..	..	. . . .	..	..
	a′ b	4278	20 55 55	+22 45.5	7.3	54.9	0	7.23	*02*,00,02 .	7.21	*02*
	a d	4216	20 55 29	+23 6.1	7.9	51.0	..	7.82	02,*03* . .	7.82	00
	b .	4243	21 0 34	+23 0.2	8.3	46.7	..	8.28	A . . .	8.22	*06*
	c g	4286	20 57 26	+22 47.4	8.7	41.2	13	8.62	06,15,*22* .	8.59	*03*
	d .	4293	20 58 39	+22 54.9	8.5	37.4	16	8.80	06 . *21*,15	8.83	03
	e .	4288	20 57 28	+22 51.1	9.0	33.1	26	9.28	18 . *17* .	9.14	*14*
	f .	4232	20 58 12	+23 0.9	9.4	28.6	32	9.35	. . A .	9.57	22
	g m	4231	20 58 2	+23 15.2	9.5	25.0	53	9.94	. *15*,16 .	10.02	08
	h r	..	20 57 25	+23 18.5	..	23.1	70	10.82	03,04,*06*,01	10.42	*40*
Vulpecula	S	3674	19 42 27	+26 55.6	..	..	..	..	. . . .	..	..
	f′ .	3704	19 47 3	+26 53.0	8.0	..	..	..	. . . .	..	..
	f .	3532	19 44 50	+27 18.5	8.8	..	42	8.52	22 . *22* .	..	..
	m .	3535	19 45 32	+27 22.7	9.0	..	57	8.80	. . A .	..	..
	g .	3665	19 40 39	+26 48.2	9.1	..	61	9.03	13 . *13* .	..	..
	h .	3660	19 39 49	+26 43.3	9.3	..	67	9.10	. . A .	..	..
	k .	3661	19 39 50	+26 50.2	9.4	..	..	..	. . . .	..	..

REMARKS.

R Andromedae. Hagen 37, 92 grades, R. A. $0^h 16^m 24^s$, Dec. +37° 43′.3, does not coincide with either y or z.

S Aquarii. The means of the three estimates in V are given in Table I.

S Aquarii, c. Here assumed to be −21° 6348, R .A. $22^h{\cdot}52^m 47^s.2$.

S Aquarii, b. Here assumed to be −21° 6342, Dec. −21° 23′.3.

R Aquilae. Schönfeld's estimates of p to s′ were made with a larger telescope, with which o = 26.2.

S Aquilae. Additional estimates, by Hisgen, 54, 66, 78, 80, 93, and 109.

S Aquilae, a′. Here assumed to be +15° 4080, R. A. $20^h 5^m 0^s.8$, Dec. +15° 37′.2.

S Aquilae, a. Here assumed to be +15° 4079, R. A. $20^h 5^m 0^s.0$, Dec. +15° 10′.3.

T Arietis. Additional estimates, by Hisgen, 36, 54, 70, 72, 74,and 85.

T Arietis, m. In V, Dec. +15°.

T Arietis, d. In V, +16° 337.

R Aurigae, d. In V, Dec. +53° 29′.6. Error of 10′, in V, assumed from Hagen, and confirmed by photographs.

R Bootis, m. Assumed to be identical with t in H. A. **37**, R. A. $14^h 31^m 19^s$.

S Bootis, l′. Double. Hagen's estimates, 23 and 24 grades, were not used in deriving the magnitudes.

S Bootis, h. In V, Dec. +54°.

R Camelopardi. The magnitudes in the sixth column are those of Carrington, not those in the Durchmusterung.

T Cancri. Additional estimates, by Hisgen, 0, 16, 21, 37, 42, 40, 45, and 54.

T Cancri, f. In V, +20° 2243, which is the variable.

V Cancri, q. In V, +17° 1736.

V Cancri, h. In V, +17° 1726.

R Canis Minoris, c. Residual in last column 119. The estimates of Schönfeld and Hagen are discordant.

T Canis Minoris, e. In V, Dec. +12°.

U Capricorni. In V, the positions of only two stars are given, but observations with the 12-inch Meridian Photometer have determined the scale of Hagen's stars, and from this the magnitudes given have been derived.

R Cassiopeiae. Additional estimates, by Hisgen, 0, 19, 41, 50, 55, 59, 88, 87, 89, 96, and 113.

R Cassiopeiae, h. In V, +49° 4208.

o Ceti. Additional estimates, by Hisgen, 6, 22, 25, and 32.

o Ceti, 75 is 75 Ceti.

o Ceti, m. In V, −5° 378.

R Ceti, f. Residual in last column, 107.

R Ceti, c. In V, Dec. −0° 54′.5.

S Ceti. In V, the designation of the first comparison star is Nova?

S Comae Berenicis. This star is probably not variable.

T Coronae Borealis, k. In V, R. A. $15^h 53^m 39^s.3$.

R Corvi. The positions and magnitudes of the stars g, e, and c are discordant. Hagen 6 follows g 8^s, south 3′.3. Hagen 8 precedes e 1^s, south 5′. Hagen 12 precedes c 4^s, north 5′. Photometric measures of stars near the positions in V gave the magnitudes, 12.97, 12.58, and 12.34, respectively.

S Cygni. The magnitudes of stars g and e are discordant.

T Cygni, l. In V, +34° 4069.

U Cygni. Additional estimates, by Hisgen, 24, 32, 56, 99, and 107.

S Delphini, k. In V, +16° 4339.

S Delphini, l. In V, +16° 4355.

T Delphini, e. In V, + 16° 4256.

ζ Geminorum. x is κ Geminorum.

η Geminorum, θ. In V, +34° 1480.

R Geminorum, w^3. In V, +22° 1556.

R Geminorum, a. In V, +22° 1596.

R Geminorum, d. In V, magn. 9.6.

T Geminorum. In V, −24° 1778.

T Geminorum, k. In V, +24° 1767.

U Geminorum. The adopted magnitudes of the comparison stars are taken from H. C. 136. The sum of the residuals, therefore, is not zero.

R Herculis, a. In V, no B. D. number or magnitude.

T Herculis, l. In V, +31° 3216.

T Herculis, e. In V, +30° 3138.

T Herculis, c. In V, magn. 10. No B. D. number.

U Herculis, l. In V, +16° 2493.

U Herculis, k. In V, R. A. $16^h 20^m 35^s.5$.

R Hydrae. α is α Corvi, C.DM. −24° 10174, magn. 4.2.

S Hydrae. In V, both +2° 2088 and +2° 2073 are called f.

T Hydrae, p. In V, magn. 8.5. No B. D. number.

R Leonis. Additional estimates, by Hisgen, 0, 17, 21, 38, 54, 60, 68, and 78. The values in the seventh column are the means of the various annual results of Schönfeld, after subtracting 5.0 from the results for 1874.

R Leporis. Additional estimates, by Hisgen, 0, . . ., and 25.

S Librae, h. In V, no B.D. number or magnitude.

β Lyrae. The observation and reduction of this variable star are always difficult, since three of the best comparison stars, ε, ζ, and δ Lyrae are double, and β Lyrae itself has a faint adjacent star. It is, therefore, difficult to decide whether the theoretical magnitude, found by combining the measured brightness of the components, can safely be used. The residuals in the last column are so small that this step seems to be justified.

R Monocerotis, R. In V, no B.D. number.

R Monocerotis, b. In V, R. A. $6^h 36^m 52^s$. No B.D. number.

S Orionis, d. In V, −5° 1258.

S Orionis, e. In V, −5° 1249.

R Pegasi, α′. In V, +8° 4968.

R Pegasi, ζ. In V, −10° 4994.

S Pegasi, q. In V, 2.1 is given as the B. D. magnitude. It is here assumed to be Schönfeld's estimate.

S Persei, g. In V, +57° 556.

S Piscium, z. In V, B .D. +7° 194, magn. 8.7.

S Piscum, s. Schönfeld's estimate is − 6.6 grades.

T Piscium, h. In V, R. A. $0^h 23^m 10^s$.

R Sagittae. Additional estimates, by Hisgen, 38, 45, 54, 64, 62, 71, 69, and 80.

R Sagittae, R. In V, no B. D. number.

T Sagittarii, f. In V, R. A. $18^h 8^m 42^s.8$.

T Sagittarii, m, k. These stars were observed in H. A. **24**, but as the results are discordant, and depend on observations on a single night, they have been rejected.

U, V Sagittarii. In V, the comparison stars are not identified.

R Scorpii, w. −22° 4134, magn. 9.8, follows this position 5^s, south 0′.6.

R Scuti, d. In V, −5° 4836.
R Scuti, m. In V, −5° 4845.
R Serpentis. R is Pi.XV, 203.
T Serpentis, h′. In V, +6° 3786.
R Tauri, a′. In V, Dec. +10° 27′.5.

S, T Ursae Majoris. In V, the comparison stars for these variables are given in a single list. The magnitudes, as estimated by Schönfeld, appeared to be very discordant until separate lists were made of the stars suited for comparison with S, and with T. The three brightest stars are common to both lists.

R Virginis. Additional estimates, by Hisgen, 16, 31, 36, 44, 51, 75, 80, 91, 89, 101, and 108.

V Virginis, e. The variable star, W Virginis, *132002*, discovered by Schönfeld. In Hagen's Series IV. In V, −2° 3693.

V Virginis, d. In V, no B. D. magnitude.
R Vulpeculae, e. In V, +22° 4287, R. A. $20^h 58^m 28^s.3$.

S Vulpeculae. Additional estimates, by Hisgen, 53, 67, 71, and 77.

S Vulpeculae, f. In V, Dec. +26° 18′.5.
S Vulpeculae, m. In V, Dec. +26° 22′.7.

The variables are arranged in the order of right ascension in Table II, which also gives some of the results which may be derived from Table I. The designation of the variable, which gives its right ascension for 1900 in hours and minutes, and its declination for 1900 in degrees, is given in the first column. The name of the variable is given in the second column. The number of the Series of Hagen is given in the third column. S Ursae Majoris is in Series III and IV, χ Cygni is in Series III and V, *o* Ceti and R Hydrae are in Series IV and V. Hagen's estimates of R Librae, in Series VI, have not been used in Table I. The number of comparison stars and the number for which Schönfeld estimated the brightness in grades are given in the fourth and fifth columns. The last five columns give the average deviations of the four residuals in the tenth column of Table I, and of the residuals in the last column of the same Table. They, therefore, represent the average deviations of the adopted magnitude in the ninth column of Table I from the magnitudes as determined with the 4-inch Meridian Photometer, as given in H. A. 37, as derived from the estimates of Hagen, as measured with the 12-inch Meridian Photometer, and as derived from the estimates of Schönfeld.

TABLE II.

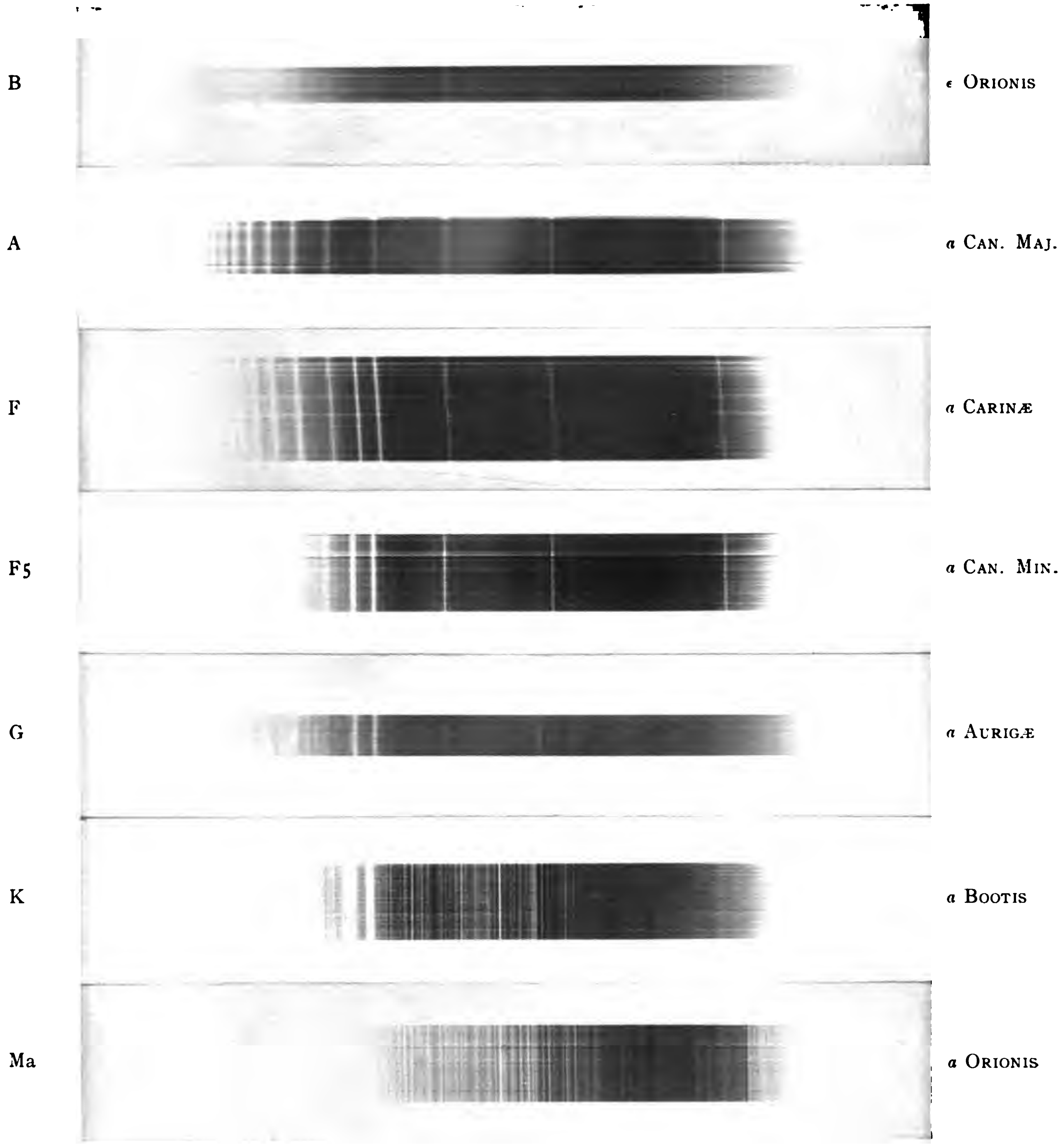
RESULTS DERIVED FROM TABLE I.

Design.	Name.	H. S.	C. S.	S. S.	4 in.	37	H.	12 in.	Sch.	Design.	Name.	H. S.	C. S.	S. S.	4 in.	37	H.	12 in.	Sch.
001755	T Cassiopeiae	III	9	0	07	04	07	..	..	*022000*	R Ceti	I	10	10	05	07	10	18	12
001838	R Androm.	III	18	12	08	03	10	..	12	024217	T Arietis	IV	9	0	18	..	07	06	..
001909	S Ceti	I	12	10	07	05	08	05	08	025838	*ρ* Persei	V	6	6	..	..	..	..	06
002614	T Piscium	II	9	9	..	..	10	10	07	030140	*β* Persei	V	9	9	..	..	..	..	09
011272	S Cassiopeiae	III	10	10	09	04	07	08	08	R	*o* Tauri	..	5	0	..	..	..	..	..
011208	S Piscium	II	11	9	03	..	03	03	11	032335	R Persei	III	11	11	01	..	04	04	11
012502	R Piscium	II	10	6	07	05	06	00	08	035512	*λ* Tauri	V	6	0	..	..	..	..	..
015912	S Arietis	II	7	7	..	..	10	10	10	041619	T Tauri	II	7	0	..	..	07	07	..
021024	R Arietis	II	15	15	05	06	06	..	06	042209	R Tauri	II	9	9	02	02	01	..	08
021403	*o* Ceti	V	13	11	05	05	05	13	11	042309	S Tauri	II	4	0	..	..	..	..	..
021558	S Persei	III	5	0	04	..	04	..	..	044617	V Tauri	II	12	0	..	..	..	..	..

Design.	Name.	H. S.	C. S.	S. S.	4 in.	87	H.	12 in.	Sch.
045307	R Orionis	II	7	7	..	..	06	06	02
045443	ε Aurigae	V	3	0	..	..	..	..	..
045514	R Leporis	IV	3	3	04	..	04	..	00
050953	R Aurigae	III	17	17	08	07	08	..	11
052404	S Orionis	I	6	0	16	..	08	12	..
052700	δ Orionis	..	2	0	..	..	..	..	..
060822	η Geminorum	V	4	3	..	..	..	..	02
063308	R Monoc.	VI	6	0	..	..	01	01	..
065355	R Lyncis	III	9	7	05	02	05	..	06
065820	ζ Geminorum	V	3	3	..	..	..	..	00
070122a	RGeminorum	II	12	7	08	08	10	02	12
070310	R Canis Min.	IV	13	7	14	..	07	11	09
072708	S Canis Min.	II	10	10	06	04	05	..	07
072811	T Canis Min.	II	9	9	..	..	07	07	14
073723	S Geminorum	II	10	9	09	..	08	06	09
074323	T Geminorum	II	10	9	06	..	12	09	07
074922	UGeminorum	II	17	14	25	..	10	09	08
081112	R Cancri	II	6	0	07	05	07	03	..
081617	V Cancri	II	9	9	08	05	10	04	13
083019	U Cancri	II	8	8	12	..	07	06	05
083819	S Cancri	IV	6	0	05	..	04	..	..
084803	S Hydrae	II	14	0	07	04	06	..	..
085008	T Hydrae	I	12	10	06	06	11	18	08
085120	T Cancri	IV	9	8	11	..	12	09	05
093934	R Leon. Min.	III	14	14	10	07	11	07	08
094211	R Leonis	IV	12	12	07	..	08	06	11
103769	R Ursae Maj.	III	14	14	08	06	18	..	13
110506	S Leonis	II	6	6	..	..	07	07	11
120905	T Virginis	I	7	5	09	03	14	..	02
121418	R Corvi	I	11	11	10	08	10	07	15
123160	T Ursae Maj.	III	11	10	05	04	10	13	19
123307	R Virginis	IV	15	0	09	05	06	10	..
123961	S Ursae Maj.	R	12	11	06	05	09	15	15
124606	U Virginis	II	12	12	09	10	12	36	06
R	S Comae Ber.	..	2	0	..	..	..	..	..
132202	V,W Virginis	I	9	8	09	07	12	11	06
132422	R Hydrae	V	4	0	..	..	..	..	..
132706	S Virginis	I	14	10	07	06	10	29	06
141954	S Bootis	III	12	7	03	06	07	24	07
142584	R Camelop.	III	8	8	06	08	08	09	11
143227	R Bootis	III	13	13	04	04	04	..	05
145508	δ Librae	V	5	0	..	..	..	..	..
151520	S Librae	I	6	6	03	03	08	..	06
151432	U Cor. Bor.	IV	18	9	05	06	04	..	10
151731	S Cor. Bor.	III							
151714	S Serpentis	II	11	0	08	06	05	..	..
154428	R Cor. Bor.	III	15	11	08	05	11	..	16
154615	R Serpentis	II	14	13	12	..	10	02	09
154715	R Librae	VI	5	5	..	..	..	..	..
155526	T Cor. Bor.	VI	8	0	..	..	..	..	..
160118	R Herculis	II	10	10	05	04	04	..	06
*161122*a	R Scorpii	I	9	7	07	02	06	02	18
*161122*b	S Scorpii								
162119	U Herculis	II	12	11	04	02	03	..	16
162816	S Ophiuchi	I	9	6	..	..	02	03	22
164715	S Herculis	II	13	13	05	04	08	12	10
170215	R Ophiuchi	I	6	6	06	03	04	..	11
180531	T Herculis	III	15	15	08	07	11	..	11
182306	T Serpentis	VI	8	0	..	..	02	02	..
182619	U,V Sagittarii	..	0	0	..	..	..	..	..
184008	T Aquilae	IV	3	0	03	..	08	05	..
184205	R Scuti	V	10	0	05	05	..	..	..
184633	β Lyrae	V	8	8	..	..	..	..	11
190108	R Aquilae	II	20	18	36	..	21	14	08
191017	T Sagittarii	I	11	10	..	..	06	05	09
191019	R Sagittarii	I	8	0	09	09	11	..	..
191319	S Sagittarii	I	6	0	43	..	11	09	..
193449	R Cygni	III	19	10	12	06	14	..	13
194427	S Vulpeculae	IV	6	0	18	..	18	..	..
194632	χ Cygni	R	25	14	08	06	10	17	10
194700	η Aquilae	V	6	6	..	..	..	..	06
R	R Cephei	..	5	0	..	..	..	..	..
200357	S Cygni	VI	9	9	00	01	01	..	21
200514	R Capricorni	I	11	9	..	..	09	09	12
200715a	S Aquilae	IV	8	7	06	..	06	00	03
200916	R Sagittae	IV	8	7	18	..	06	14	11
201008	R Delphini	II	14	14	07	06	08	..	10
201647	U Cygni	IV	8	8	08	12	20	11	05
203816	S Delphini	II	9	9	12	..	09	08	10
204016	T Delphini	II	12	0	11	..	08	06	..
204215	U Capricorni	I	7	7	..	..	..	..	..
204334	T Cygni	..	3	0	..	..	..	..	..
204405	T Aquarii	I	13	10	09	06	05	..	26
205923	R Vulpeculae	II	9	9	06	07	14	08	11
211615	T Capricorni	I	8	8	01	..	06	07	08
220412	T Pegasi	II	7	6	..	..	04	04	11
222557	δ Cephei	V	6	0	..	..	..	..	..
225120	S Aquarii	I	7	7	06	03	10	02	12
230110	R Pegasi	II	11	6	11	01	11	06	07
231508	S Pegasi	II	15	15	06	07	08	..	09
233815	R Aquarii	I	13	7	05	05	08	..	11
235350	R Cassiopeiae	IV	16	12	06	06	07	..	10

It appears from Table II that the total number of variables discussed by Schönfeld is 112. W Virginis is included, but R Cephei, S Comae Berenicis, V Sagittarii, and *o* Tauri are omitted, since they are probably not variable. The total number of comparison stars is 1073, and the number for which magnitudes have been derived from the estimates of Schönfeld is 743. The means of the average deviations in the last five columns are ±0.084, ±0.052, ±0.080, ±0.089 and ±0.096. Therefore, the magnitudes found from the measures with the 4-inch Meridian Photometer, from Hagen's estimates, and from the measures with the 12-inch Meridian Photometer, are about equally good, and deviate from the adopted magnitudes by a little more than eight one hundredths. The deviations of Schönfeld's measures are somewhat greater, but this is probably because they were not included in deriving the mean magnitudes. The adopted magnitudes in H. A. 37 are more accordant, as is to be expected, since they were derived from the mean of several series of determinations.

PLATE I.



TYPICAL STELLAR SPECTRA.

ANNALS OF HARVARD COLLEGE OBSERVATORY. VOL. LXIV. NO. IV.

DISCUSSION OF THE REVISED HARVARD PHOTOMETRY.

THE Revised Harvard Photometry furnishes the means of determining the errors in the numerous Catalogues used in compiling it. The amount of material contained in it is so great, that the stars may be subdivided into a large number of groups, and these groups combined so as to study the errors due to a variety of causes. Thus, it may be desirable to determine the effect of the right ascension, the declination, the position with regard to the Milky Way, the magnitude, and the spectrum. Although it has been pointed out in H. A. 23, 165, and in various other places in these Annals, that a serious error, commonly overlooked, may enter into results obtained by grouping, yet this appears to be the only available method of comparing the results of large numbers of individual observations. The method of grouping adopted consisted in cutting a file of proof of the Revised Harvard Photometry into 9,110 strips, corresponding to the number of stars in that work, and pasting them on sheets of paper according to their position in the sky, their magnitude, and their spectrum. The grouping according to position is that adopted in various discussions in these Annals, and is described in H. A. 14, 477, and 23, 158. The entire sky is divided into forty-eight parts, exactly equal in area, and, therefore, each including 859.4 square degrees, since the area of the entire sky is 41,252 square degrees. The entire sphere is first divided into six zones by the parallels of declination, +61° 2′.6, +30°, 0°, −30°, and −61° 2′.6. The relative areas of these zones are 3, 9, 12, 12, 9, and 3, respectively. These zones are designated as A, B, C, D, E, and F. Each zone is subdivided into equal portions in right ascension, beginning with 0^h, and each region is designated by the letter of the zone and the number of the part into which it is divided. The designation of each region and its limits in declination and right ascension, for 1900, are given in Table I, which is substantially the same as Table XXXV of H. A. 23. These regions will sometimes be described as 30° square, since those near the equator have approximately that form.

TABLE I.

DIVISION OF THE SKY.

Region.	Declination.	Right Ascension.	Region.	Declination.	Right Ascension.
	° ′ ° ′	h. m. h. m.		° ′ ° ′	h. m. h. m.
A 1	+90 0 to +61 3	0 0.0 to 7 59.9	D 1	0 0 to −29 59	0 0.0 to 1 59.9
2	“ “ “	8 0.0 “ 15 59.9	2	“ “ “	2 0.0 “ 3 59.9
3	“ “ “	16 0.0 “ 23 59.9	3	“ “ “	4 0.0 “ 5 59.9
B 1	+61 2 to +30 0	0 0.0 “ 2 39.9	4	“ “ “	6 0.0 “ 7 59.9
2	“ “ “	2 40.0 “ 5 19.9	5	“ “ “	8 0.0 “ 9 59.9
3	“ “ “	5 20.0 “ 7 59.9	6	“ “ “	10 0.0 “ 11 59.9
4	“ “ “	8 0.0 “ 10 39.9	7	“ “ “	12 0.0 “ 13 59.9
5	“ “ “	10 40.0 “ 13 19.9	8	“ “ “	14 0.0 “ 15 59.9
6	“ “ “	13 20.0 “ 15 59.9	9	“ “ “	16 0.0 “ 17 59.9
7	“ “ “	16 0.0 “ 18 39.9	10	“ “ “	18 0.0 “ 19 59.9
8	“ “ “	18 40.0 “ 21 19.9	11	“ “ “	20 0.0 “ 21 59.9
9	“ “ “	21 20.0 “ 23 59.9	12	“ “ “	22 0.0 “ 23 59.9
C 1	+29 59 to 0 0	0 0.0 “ 1 59.9	E 1	−30 0 to −61 2	0 0.0 “ 2 39.9
2	“ “ “	2 0.0 “ 3 59.9	2	“ “ “	2 40.0 “ 5 19.9
3	“ “ “	4 0.0 “ 5 59.9	3	“ “ “	5 20.0 “ 7 59.9
4	“ “ “	6 0.0 “ 7 59.9	4	“ “ “	8 0.0 “ 10 39.9
5	“ “ “	8 0.0 “ 9 59.9	5	“ “ “	10 40.0 “ 13 19.9
6	“ “ “	10 0.0 “ 11 59.9	6	“ “ “	13 20.0 “ 15 59.9
7	“ “ “	12 0.0 “ 13 59.9	7	“ “ “	16 0.0 “ 18 39.9
8	“ “ “	14 0.0 “ 15 59.9	8	“ “ “	18 40.0 “ 21 19.9
9	“ “ “	16 0.0 “ 17 59.9	9	“ “ “	21 20.0 “ 23 59.9
10	“ “ “	18 0.0 “ 19 59.9	F 1	−61 3 to −90 0	0 0.0 “ 7 59.9
11	“ “ “	20 0.0 “ 21 59.9	2	“ “ “	8 0.0 “ 15 59.9
12	“ “ “	22 0.0 “ 23 59.9	3	“ “ “	16 0.0 “ 23 59.9

The stars were divided into six groups, according to magnitude. The first group contains all those of the magnitude 4.24 and brighter, and is designated by the letter, B; the second group contains those of magnitude 4.25 to 4.74, and is designated, from its central point, 4.5; the third group contains stars from 4.75 to 5.24, and is called 5.0; the fourth group, contains stars from 5.25 to 5.74, and is called 5.5; the fifth group contains stars from 5.75 to 6.24, and is called 6.0; the sixth group, contains stars of the magnitude 6.25 and fainter, and is called 6.5.

The stars were also divided into six groups according to their spectra. Arranging them in a sequence, O, B, A, F, G, K, and M, stars in all subdivisions of O, B, B 1, B 2, B 3, B 4, B 5, B 6, B 7, and B 8, are included in group B; B 9, A, A 1, A 2, and A 3, in group A; A 4, A 5, F, and F 2, in group F; F 5, F 7, F 8, and G, in group G; G 5, G 8, K, and K 2 in group K; K 5, K 8, and all subdivisions of M, in group M.

The 9,110 stars are thus divided into 48 times 6 times 6 groups, or a possible 1,728 groups. Some of these groups do not contain any stars. The number of stars in each group and the algebraic mean of the sixteen residuals given in the Revised Harvard Photometry were next taken.

The most important factor affecting the distribution of the stars, and their spectra, appears to be the Milky Way. Accordingly, the regions north of the Milky Way, those south of it, those partly in it, and those mainly in it, were combined in four regions, designated by the letters N, S, P, and M, respectively. Twelve of the regions 30° square fall in each of these larger regions, as shown in the four sections of Table II. The designation of the region is given in the first column, the galactic longitude of the centre, in the second column, and the galactic latitude, in the third column. The point in declination, 15°, 45°, or 75°, and half way between its eastern and western boundary, is here called the centre of the region. Thus, the point in right ascension 4^h and declination +75° has the longitude 94° and latitude +43°. As in other discussions made in these Annals, the inclination of the Milky Way to the terrestrial equator is assumed to be 62°, and the right ascension of its ascending node, 18^h 40^m. The longitudes and latitudes have been found graphically from Tables I and II of H. A. 56, No. 1. On page 1 of that publication, the tenth line from the bottom, +62° should read +28°. The fourth column gives the density of the Milky Way in each region, or the proportion contained within its limits. It is found from Table II in H. A. 48, 154, where the sky is divided into regions extending over 1^h in right ascension, and 10° in declination. The proportion of the Milky Way, expressed in tenths, in each of these regions is there given. Multiplying each of these proportions by the area of the corresponding region gives the area of this part of the Milky Way, expressed in degrees. Grouping them according to regions A 1, A 2, A 3, etc., and dividing by 859.4, the area of each, we obtain the proportion included in the Milky Way. It is this proportion which is entered in the fourth column.

It will be noticed, from the third column of Table II, that the centres of all the regions contained in N, have galactic latitudes from +76° to +29°; those in S, latitudes from −33° to −76°; those in P, from +38° to +14°, and from −14° to −32°; those in M from +12° to −19°. It appears from the fourth column that the proportion of the Milky Way in N varies from .00 to .07, in S from .00 to .03, in P from .06 to .37, and in M from .42 to .77. The mean latitudes, for the twelve centres in N, S, P, and M, are 51°.1, 50°.2, 21°.9, and 8°.8, respectively. The mean proportions are .01, .00, .26, and .60, respectively. The two methods of classification do not agree exactly, mainly because the Milky Way does not form a great circle of uniform width.

TABLE II.

DIVISION ACCORDING TO THE MILKY WAY.

North.				South.				Partly.				Milky Way.			
Reg.	Long.	Lat.	Prop.	Reg.	Long.	Lat.	Prop.	Reg.	Long.	Lat.	Prop.	Reg.	Long.	Lat.	Prop.
	°	°			°	°			°	°			°	°	
A 2	94	+43	.00	C 1	97	−46	.00	A 1	102	+18	.32	B 2	123	− 4	.50
B 4	143	+47	.00	2	133	−35	.00	3	75	+22	.27	8	47	+ 6	.72
5	114	+71	.00	12	57	−40	.00	B 1	97	−17	.23	9	69	−13	.50
6	44	+61	.00	D 1	110	−76	.00	3	138	+19	.12	C 4	169	+11	.70
7	37	+46	.05	2	165	−55	.00	C 3	154	−14	.35	10	16	+ 3	.73
C 6	204	+64	.00	11	2	−38	.00	5	182	+38	.33	D 4	196	− 3	.77
7	290	+76	.00	12	24	−64	.00	11	32	−22	.23	10	349	−11	.53
8	345	+55	.00	E 1	248	−71	.00	D 3	183	−29	.22	E 3	222	−19	.42
9	3	+29	.07	2	217	−47	.00	5	212	+22	.37	4	237	+ 4	.74
D 6	237	+40	.00	8	323	−33	.03	9	334	+14	.30	6	291	+12	.43
7	277	+46	.00	9	316	−61	.00	E 5	263	+16	.30	7	312	− 6	.64
8	313	+35	.03	F 1	256	−37	.03	F 3	286	−32	.06	F 2	267	−14	.57

The detailed grouping, if published, would occupy about two hundred pages in print. An abridgment is accordingly given in Table III, which contains the results, on consecutive lines, of the forty-eight different regions, placing together those in the four regions, N, S, P, and M. These regions are indicated in the first column. The remainder of the Table is divided into six parts, corresponding to the magnitudes, B, 4.5, 5.0, 5.5, 6.0, and 6.5. Each part gives six residuals, corresponding to the spectra, B, A, F, G, K, and M, and expressed in hundredths of a magnitude. One page is devoted to each of the columns of residuals given in the Revised Harvard Photometry, except that since column D contains magnitudes derived from the Draper Catalogue for northern stars, and from the Cape Photographic Durchmusterung, for southern stars, one page is devoted to each of these Catalogues. The last page of Table III gives the number of stars contained in each group.

TABLE III.

MEAN RESIDUALS DERIVED FROM DIFFERENT CATALOGUES.

Region.	H. A. 14. Magn. B.	H. A. 14. Magn. 4.5.	H. A. 14. Magn. 5.0.	H. A. 14. Magn. 5.5.	H A. 14. Magn. 6.0.	H. A. 14. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	*4*, 2, *4*, *4*, 1, *4*	..,15,.., 2, *4*,..	.., 5, *2*, 8, *4*, *1*	.., *6*, 6, *3*, 7, *2*	.., *3*, *2*,*11*, 4, 4	.., 1, *4*, 0, *6*, 2
B 4	.., 2, 7, 3,.., 2	..,*10*,10,.., 1,..	.., *8*, 9, *4*, 5,..	*6*, 1,12, *7*, 2,10	.., *7*, *4*, *8*, *2*, *3*	.., *2*,.., *4*,*16*,..
5	.., 8,..,.., 2,..	..,.., 6, *2*,..,..	.., 5, 7,.., 5,..	.., 0, 0,38, 0, 8	.., *5*, *3*, *2*, *5*,10	.., *4*,*11*, *3*, 3, 3
6	10,..,13,19, *8*,..	..,10, *6*,..,..,..	..,12, 4, 0, *6*, *1*	*2*, 3,*16*,.., 1, 0	.., 1, *4*, *4*, 4,*10*	..,*13*, *4*, 9, *6*,..
7	4, 8,.., 4, 3, *7*	.., *2*,15,..,*10*,..	.., 4,*16*,10, *3*, *1*	*6*, 2, 2, 6, *2*,*25*	.., *4*,.., 0, 0, 5	*6*, 1,.., *5*, 2,10
C 6	11, 5,.., *6*,.., 4	.., *2*, 8, 1,.., 2	.., *3*, 6, *2*, 7, 2	.., 2,16, 4, 2, 2	*5*, *5*, *6*, *4*, *2*,23	.., *4*,.., *1*, *5*,..
7	..,..,.., 9, 4, 7	.., 2,.., 2,17,*17*	.., 5, *2*, *3*, 1, *2*	.., 4, 0, *5*,11, 1	*19*, 1, 4, *8*, *5*,10	.., *5*, 6,..,10,..
8	.., 6, 7,14,*11*,..	.., 6,.., *7*, *8*, *4*	.., 7, *3*, *2*, *8*, *7*	.., 0,*10*, *3*, *3*,*10*	.., *3*, *3*, *2*, *3*,15	.., 1, *9*, *2*, *2*,..
9	8,10, 4,.., *1*,..	12, 7,..,..,*10*,*19*	0, 7, *4*,.., *4*, 1	2, 3,15, *2*, 3,13	.., 3, 0, 3, 6, *5*	.., *9*, 6, *3*, 1,..
D 6	.., 2,..,.., *1*, 8	.., *6*, *5*,.., 1,..	*1*,*10*,.., 1, *2*, 7	*16*, *5*, *8*, 0, 4,22	.., *1*, *2*,*20*,10,12	..,*11*,*10*, *3*, *5*, 7
7	0, 5,14,.., *3*,..	.., *7*, 3,..,..,..	*8*,.., 4,.., 0, 9	18, 4, *2*,12, 2,..	.., *1*, *3*, 5,10,*10*	..,13, 0,*12*,15,..
8	3, *2*,.., 2, 6,*16*	10, 8, *6*,..,14,..	*6*, 2, 7, 1, 7,15	*9*, 3, 6, *1*,11,29	.., 6,*12*,.., 8, 5	.., *5*,..,.., 8,..
S C 1	17, *7*, 7, 0, *6*,..	.., 4,..,.., 1, 3	..,.., 8,.., 3, *2*	*8*, *3*, 2, *2*, *1*, 9	*9*, 2, *1*, 0, *4*,..	.., *6*,*13*, 0, *5*,10
2	2, 3,..,..,*11*,*14*	1, 7, 2,.., *3*,..	6, 2, 4,.., *6*,..	5, *1*, 0, 2, *4*,..	.., *8*, *1*, 5, *4*,*10*	.., *5*, 6, 8,..,..
12	*2*, 5,.., 4, 3, *5*	*3*,.., 7, *3*, *3*,..	7, 3,..,.., *6*,*11*	*17*, *4*, *9*,.., *2*, *1*	.., 3, 2, *6*, 3, *4*	.., *2*, 4,.., 0, 6
D 1	..,..,..,.., *8*,*35*	*33*,..,..,.., *6*, *6*	.., *4*, *4*,.., 7, *3*	.., *6*, *7*,.., 4, 8	..,*14*, 8,10, 2,*10*	..,*10*,.., 3, 1, 1
2	9, *6*,..,*18*,*10*,*15*	*11*, *9*,.., 2,..,*25*	*3*,*13*,*11*, *8*, 0,..	*4*, *7*, *6*, 5, 2,11	..,*13*,*10*, 1, *8*, *2*	.., *4*, 2,*18*, 2, *4*
11	.., 3, 0, 4, 1,19	*8*,..,.., 2, *1*, 2	2, 3, 1,.., 2,..	1, 2,*16*,28, 5, 2	*5*, *3*, 1, 3, 7, 8	.., 2, 6, 7, 4,..
12	*4*, 0,.., *3*,*16*, *9*	*2*, *3*,..,.., 1,*13*	7, *6*, 2,*11*, 1, 1	3, *1*, *4*,.., 4,..	.., 0, *3*, 1, 2, 7	.., *6*, *9*,.., 5,..
E 1	..,..,..,..,..,..	..,..,..,..,..,..	.., *6*,..,..,..,*18*	..,..,..,..,*15*,..	..,..,..,..,..,..	..,..,..,..,..,..
2	..,*27*,..,.., *8*, *3*	..,..,..,..,21,..	*16*,..,..,..,..,..	..,..,.., 9,..,..	.., *3*,..,..,..,..	..,..,..,..,..,..
8	..,18,..,..,..,..	*20*,..,..,..,..,..	.., *1*,..,.., 5,..	.., 0,..,..,..,..	..,..,..,..,..,..	.., *8*,..,..,..,..
9	.., *3*,..,..,..,..	..,*14*,..,.., 9,..	*1*, *4*,..,..,..,..	..,..,..,.., *2*,..	..,..,..,..,..,..	..,..,..,..,..,..
F 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
P A 1	2, 0,.., 3,..,..	3, *3*, 2,.., *6*,*10*	*3*, *8*, 2, *3*,*12*, 2	*3*, *4*, *1*, *6*, 0, 3	.., *5*, *5*,13, *3*, 4	..,*12*, *3*,*15*, *6*, *1*
3	6, *3*, *2*, 3, *5*,..	.., *4*, 5,.., *3*,..	2, 0, *3*, *4*, 4, *2*	*4*, *3*, *3*,.., *1*, *5*	4, *2*,.., 4, *1*, 1	.., *3*,..,.., 7, 2
B 1	4, 3, 4, 2,*13*, *6*	*2*, 0, *9*,..,..,..	*5*, 6, *1*, *3*, 0,11	*3*, *2*, 6, 2, *3*, *2*	.., *5*, 5, 2, *3*,*29*	7, 3,..,.., 6,..
3	.., 2, *3*,.., *4*,..	.., 2,..,.., 2,*12*	12, *5*,*16*,13, 3,21	*14*, *4*, 2, 4, *2*, *5*	.., 0, *6*, 2, 2, *3*	.., *4*, 1, *4*, 0,..
C 3	9, 5, 0, 1, *1*, *4*	*2*, 8, 7, 3, *1*,*16*	1, *3*, 1, 4, 1,25	4, 0, *4*, 4, 3, 7	*4*, *1*,*13*, *2*, 1,..	.., 2, *6*,..,12,..
5	.., 2,.., 5, 6,..	*15*, *4*, *1*,.., 2,*12*	*11*, 8, *7*,*16*, *2*, 8	.., 1, *4*, *1*, 4,11	.., *3*, *5*, *5*, 2, 5	.., *2*, 2, *2*, 8,..
11	12,.., *3*, *7*, 0,..	.., 3,.., *4*, *1*,..	4, 0, 3,*14*, *5*, 0	.., *5*, *2*, 9, 3,*12*	*1*, *5*, 0, 6, 2, 4	..,.., 0, 0, *2*, *4*
D 3	2, 0, *2*, *1*, 3, *3*	*1*, 1,*20*,.., *3*, *6*	*11*, *4*,10,14, *6*, *7*	*10*, *8*, *7*, 2,11,13	*1*, *4*, *6*,*17*, *4*, 6	*2*,*14*, *2*, *7*, *8*,..
5	.., *9*,.., 0, 2,..	*12*,10,.., 5, *6*,..	*2*, *5*, *5*, *2*, 2, 4	3, *6*,*12*,*10*, 1, 4	*2*, *8*, *8*, 0, *7*,..	..,*16*, 6, 0, 0,..
9	2, *1*, 3,.., 0,*21*	4, *1*, 2, 2, 1,..	*2*, *5*, 9,*10*, 8,..	2, 2, 2, 4, 7, 8	*20*, *3*, *3*,*13*, 5,..	..,*12*, *1*, *5*, *3*,..
E 5	..,..,..,.., 4,..	..,*22*,..,..,..,..	..,..,..,..,..,17	..,..,..,..,17, 6	..,*17*,16,..,..,..	..,..,..,..,..,..
F 3	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
M B 2	11,..,.., 0, *5*,..	4, 3,17, *4*,*16*,13	*1*, 4, *6*,10, *1*,..	*4*, 2, 3, *4*, 3,..	10, *2*, *2*, *4*, *5*,16	..,*20*,21, *3*, *3*,..
8	.., 5,12, 2, *4*,*19*	2, 9, 5, *3*, *6*, 2	*2*, *1*, *1*, 5, 0,..	*4*, 0, *2*, *5*, *3*, 2	*12*, *2*, 1, *3*, 4, *3*	*1*, *4*, 4, 6, 1, 6
9	14, 5, 1,.., *6*,..	8, 4, 8, 3, *1*,..	1, 2, 1,*29*, *2*,*12*	*3*, *1*, 0, *4*, *4*, 3	*7*, *5*, 1,.. 2,..	.., *4*,11,.., *6*,..
C 4	*5*, 0,14, *3*, 0, 0	*9*,*19*, 8,.., 0,..	*9*, *9*,.., *2*, *1*, *2*	*25*, *1*, *9*, *4*, *7*, 0	*15*, *8*, *2*, 4, *1*, 5	*11*, *8*, *3*,..,.., *8*
10	..,12, 5,.., *1*, *6*	12,16,19, *6*, 2, 6	3, 1, *4*, 1, 0,..	15, 0, 2, *7*, 3, 1	0, 1, 1, 4, *4*,..	.., *4*, 7, 7, 2,..
D 4	*5*, 4,..,*10*, 3,*19*	*8*,*14*,.., *9*, 3, *2*	*10*, *4*,.., *9*, 1, 2	*15*,*11*, *8*, *6*, 2, 2	*2*, *4*, *3*,*12*, *2*,..	*18*,*16*,*17*, 1,..,..
10	9, 7, 4,.., *2*,..	4, *2*, 1,*12*, 6, 6	*2*, 6,10,13, 8, *6*	3, 6, 6, 2,12,13	10, 1, 3, 3, 1, 4	.., 3,.., 0, *2*,26
E 3	1,..,..,..,*11*,..	*32*,..,..,..,..,..	2, *4*,.., 2,..,..	*3*,*29*,..,..,..,..	..,..,..,.., 3,..	..,..,..,..,..,..
4	*15*,..,..,..,..,..	..,..,..,..,.., 8	..,..,..,..,..,..	.., *9*,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
6	..,*10*,..,..,*53*,..	..,..,..,.., *5*,..	*10*,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,.., 3,..,..,..
7	0,17,..,..,*12*,*19*	..,..,..,..,..,..	..,20,..,..,..,..	..,.., *2*,15, 8,..	..,..,..,..,..,..	..,..,..,..,..,..
F 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..

Region.	H. A. 23. Magn. B.						H. A. 23. Magn. 4.5.						H. A. 23. Magn. 5.0.						H. A. 23 Magn. 5.5.						H. A. 23. Magn. 6.0.						H. A. 23. Magn. 6.5.					
	B	A	F	G	K	M	B	A	F	G	K	M	B	A	F	G	K	M	B	A	F	G	K	M	B	A	F	G	K	M	B	A	F	G	K	M
NA 2	..	*3*	1	0	0	0	..	..	..	*2*	..	..	..	*5*	1	..	0	2	..	0	*5*	..	*2*	*1*	..	0	0	..	0	..	..	..	..	..	*1*	..
B 4	..	..	*4*	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
C 6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
D 6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
SC 1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
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2	..	5	..	..	11	14	..	..	..	..	7	..	1	2	..	*8*	*7*	..	..	..	..	*4*	10	..	..	4	*1*	..	*4*	..	..	*9*	..	..	..	..
8	..	*28*	..	..	*22*	..	*12*	..	..	..	*11*	..	..	*2*	..	*20*	0	*9*	*26*	*21*	*16*	*11*	*9*	*2*	*22*	*19*	..	..	*11*	*16*	..	*29*	..	..	..	..
9	..	*6*	..	..	..	..	..	*3*	..	..	3	..	8	*9*	..	10	*2*	0	..	0	*2*	..	*2*	4	*8*	*2*	*15*	..	*8*	..	..	..	..	..	..	48
F 1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PA 1	2	..	..	..	..	..	*3*	*2*	*3*	..	..	7	*4*	..	..	..	..	..	..	*4*	3	..	0	2	..	0	0	..	*2*	*4*	..	..	..	..	..	..
3	*4*	*5*	*5*	*6*	0	..	..	0	*2*	..	0	..	*3*	0	2	0	0	*3*	..	1	*2*	..	2	3	..	2	..	3	2	..	..	..	..	..	..	4
B 1	..	..	*1*	*3*	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
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E 5	..	*17*	..	..	*2*	..	..	4	*14*	..	*3*	..	1	*14*	..	*4*	*7*	*4*	..	*6*	..	..	8	2	*18*	*17*	*10*	*6*	5	..	..	*9*	10	..	..	..
F 3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
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E 3	*4*	..	..	..	16	12	*8*	..	..	..	*4*	..	*16*	*9*	*13*	*7*	6	..	*12*	*17*	*17*	2	8	..	22	*10*	*16*	..	*1*	10	*16*	..	..	..	..	..
4	*12*	..	..	3	10	..	..	..	*16*	*6*	4	2	*2*	*7*	..	7	8	..	..	*11*	..	*5*	*1*	24	..	..	*2*	..	..	..	..	..	..	..	..	..
6	*11*	*7*	..	..	8	*5*	*13*	*8*	..	11	*13*	29	*12*	*2*	*11*	..	..	..	*8*	*11*	*7*	..	12	..	*20*	*8*	2	..	..	..	..	..	*13*	..	..	..
7	*28*	*5*	..	..	3	1	*12*	..	..	..	*3*	*6*	*20*	*34*	..	..	0	..	*19*	*23*	*13*	*12*	*5*	..	..	*12*	*31*	..	7	*2*	..	..	..	..	..	..
F 2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Region.	H. A. 24, 1. Magn. B.	H. A. 24, 1. Magn. 4.5.	H. A. 24, 1. Magn. 5.0.	H. A. 24, 1. Magn. 5.5.	H. A. 24, 1. Magn. 6.0.	H. A. 24, 1. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	..,*14*,..,..,..,..	..,..,..,..,15,..	..,..,..,..,..,..	..,*11*, *2*, *7*, 2,..	.., *2*, 2,.., *6*,..	.., 0, 2, 1, *1*, 7
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S C 1	..,..,*27*,..,..,..	..,..,..,..,27,..	..,..,..,..,..,..	..,12,..,..,..,..	8, 9, 1,*29*, 4,..	.., *2*,30, 5, 5, 0
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3	..,..,..,..,..,..	.., 1,..,.., *8*,..	..,.., *2*,.., 0,..	.., *4*,..,.., 4,..	1, *2*, 2, 0, 2,..	.., *2*,*10*, 1, 1, 4
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C 4	..,..,..,..,..,..	4,..,..,..,..,..	..,..,.., 7,..,..	.., *4*,..,..,10,..	4, 3, 3, *6*, *2*, *7*	.., *4*, 3, 1, *4*, 7
10	..,..,..,..,13,..	..,..,..,..,..,..	14,13,12,15,..,..	..,10,..,10, 6,..	.., *2*,14,.., 6,..	.., 1,13, 0, 3,*16*
D 4	*9*,..,..,.., 0,..	6, *1*,.., 6,..,..	8,*11*,..,.., 3, 1	8, 9, *6*, 6,*16*, 4	12, 3, 6, 2, 5,..	.., 2, 9, *4*, *2*, 2
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Region.	H. A. 24, 4. Magn. B.	H. A. 24, 4. Magn. 4.5	H. A. 24, 4. Magn. 5.0.	H. A. 24, 4. Magn. 5.5.	H. A. 24, 4. Magn. 6.0.	H. A. 24, 4. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	..,..,..,..,..,..	..,..,..,..,..,..	..,.., *8*, 0, 1,..	.., 6,..,..,..,..	.., *2*, 8,.., 0,..	.., 0,..,..,..,..
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C 6	*2*,*11*,.., 0,.., 4	.., 4,*14*,..,.., 2	..,13,.., *8*, 0, *4*	.., 2, *2*, *2*,*10*,..	.., 9, *6*,.., 0,*12*	.., 4,*16*, 3,..,..
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S C 1	*10*, 1,15,..,..,..	..,..,..,..,15,..	..,..,..,..,10, 1	19, *7*,13,..,15, *2*	.., 7, *7*,25, 8,..	..,22,13, 6, 3,..
2	*6*, 9,..,..,12,11	0, *5*,..,.., 2,..	*20*, 1,..,..,12,..	4, 3, 2,..,..,..	4, 3, *3*, 8, *4*, 6	.., 3, 0, 7, *4*,..
12	*6*, 0,..,*15*,..,..	22,..,15, 4, *4*,..	.., 8,..,..,..,18	*1*, *2*,12,.., 1, *5*	.., 0,22,.., 7, 8	.., *5*,.., 7,10,..
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2	*16*, *4*,..,10, 3,16	*1*, 4,.., 3,..,..	1, 8,..,.., 6,..	.., 5, 5, 0,..,..	.., 4, 8, 1, 7, 9	.., 2, 7, 7, 3,10
11	.., 8,.., 5,.., *1*	..,..,..,*14*, *8*,*24*	..,..,*12*,.., 7,..	..,*12*, 7,*32*,*10*,*15*	*2*, 0, 1, 7, *6*,*25*	.., 0,..,.., 3,..
12	14,..,.., 9,23,..	.., *3*,..,..,*10*, 9	.., *4*,..,18,15,..	.., 2, *6*,.., 6,..	.., *8*, 4, *1*, 2,..	.., 8, 6,.., *5*,20
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P A 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	*4*, *4*, *5*,..,*11*,..	..,20, *2*,.., 3,..	..,..,..,.., 0,..
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B 1	..,*12*, 6, 0,17,..	..,..,..,..,..,..	..,*13*, 4,13,..,..	*11*,.., 9,.., 4,..	.., 6,16,..,..,..	3,..,.., 4,..,..
3	..,..,..,..,..,..	..,..,..,.., 6,..	..,..,..,.., *3*,..	..,..,.., 1, 5,..	.., 4, 1, 9, *8*,..	..,10,..,..,17,..
C 3	1, *4*,.., 5, 1, 5	2, *7*,10, 8,10,..	4, 2, *2*,.., 1,..	*6*, 5,15, 7,..,..	2, 3, 0,10, 0,*20*	.., 5,..,.., 7,..
5	.., *4*,.., 0, *6*,..	11,26,14,..,..,..	2,..,..,*20*, 0,*20*	.., 0,.., *6*,10,..	.., 0, 9, 4, *3*, *2*	.., *1*,.., *4*,.., 2
11	*18*,.., 3, 5,..,..	.., *2*,.., 1,25,..	.., 2,..,12,..,..	..,12, 4, 0, 6,11	9, 7, 3, *5*, 4, 0	.., 0,*11*, 0, 3, *8*
D 3	*10*, 2,.., 1,..,14	13, 3,..,..,24,..	4, 2, 0,.., *2*,..	*10*, 2,10,.., 8,..	.., 2,11, 3, 3, 6	.., 5, 0,11, 0,..
5	..,..,.., *5*, *2*,..	13,..,..,..,..,..	.., 6, 2, *1*, *1*, 5	..,10, 7,12, 1,..	*13*, 1, 2,.., 2,..	.., *5*,*10*, *3*, *6*,..
9	2,23,..,..,..,11	*4*,*13*, 8,28,..,..	16,10, *1*,*10*,..,..	3,10,17,.., 4, *6*	30, 0,*12*,14,10,..	..,13, 1,16,..,..
E 5	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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M B 2	*13*,..,..,.., 2,..	.., *4*,.., 2,..,..	*2*, 2, 3,..,..,..	*4*, *8*, *2*, *4*, *3*,..	.., *4*, *3*,..,..,..	..,..,..,.., 8,..
8	.., *5*,..,.., 5,15	.., *9*,.., 6,..,..	.., 4,.., *6*,13,..	1, 5,.., 8, 2,..	17, 8,..,.., 4,..	15,.., *6*, 4,..,12
9	..,..,..,.., 4,..	..,..,..,..,..,..	*3*,..,..,.., 6,11	.., 2,.., *6*,..,..	..,12,..,.., 6,..	..,.., *3*,.., 1,..
C 4	.., *2*,.., 6, 5,..	7,11,..,..,*14*,..	2, 6,.., 4, *2*,..	.., 1,*12*,.., *3*,..	4, 1, 6, *4*, *1*, 2	4, *9*,.., 7, *3*,16
10	.., *8*, 4,.., *5*, 1	..,..,..,.., 4,..	16, 9,.., *1*, *6*,..	37, 6, 6,10, 0,..	8, 5, *7*,.., *3*,..	.., 1,..,20, *1*,..
D 4	2, *6*,.., 5, 5,14	5,13,.., *3*, 6,..	8, 1,..,.., 7, 5	6, 2,11, 2, 3,..	7, 9,12, 6, 2,16	15,21,..,..,.., *2*
10	4,..,*19*,.., *1*,..	.., *9*,.., 5,*12*, *2*	..,11,*13*, *4*, *1*,..	1, 0, *5*,.., *6*, 1	14, *3*, *3*,*10*, 1,10	..,..,*37*, 6,17,*16*
E 3	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
4	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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7	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
F 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..

Region.	H. A. 24. Magn. B.	H. A. 24. Magn. 4.5.	H. A. 24. Magn. 5.0.	H. A. 24. Magn. 5.5.	H. A. 24. Magn. 6.0.	H. A. 24. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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7	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
C 6	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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D 6	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,10,..,..	..,14,..,..,..,..	..,14,..,..,..,..
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8	..,..,..,..,..,21	6,..,..,.., 6,..	..,..,..,12,..,..	.., 1,..,..,..,..	.., 1,15,..,..,..	11,..,..,..,..,..
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D 1	..,..,..,..,..,..	7,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,12,..	..,..,..,.., 4,..	..,..,..,..,..,..
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12	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,19,..,..	..,13,..,..,14,20
E 1	6, 5,..,.., 6, 8	16, 8,..,.., 6,30	.., 4,..,10, 5,15	.., 6, 8,11,15, 6	.., 6,11,12,10,20	..,10, 5, 4, 0, 7
2	..,12,..,.., 9,12	..,.., 3, 5,12,..	6, 0, 8, 1, 1, 1	..,.., 5, 1,11,..	.., 0, 3, 6, 8,..	.., 2, 2,11,10, 7
8	6, 4,..,.., 9,..	29,.., 6,..,10,..	.., 5, 4, 5, 4,10	5, 6, 7, 4, 8, 2	12, 0, 2, 6, 4, 2	.., 4, 8,.., 4, 8
9	24, 1,12,.., 1,15	.., 9, 5, 5,17, 0	6,10,.., 6, 4,12	2, 6, 3, 0, 6, 9	0, 7, 1, 3, 7, 2	14, 0, 2,.., 2, 3
F 1	..,.., 4, 7, 4, 5	.., 7, 3, 6, 8, 8	8, 7,10, 3, 3, 3	8, 5, 0, 2, 3, 5	.., 0, 1, 7, 1, 7	6, 5, 7, 7, 3, 6
P A 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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9	2,..,..,..,..,..	..,..,.., 6,..,..	5,..,..,..,..,..	..,..,..,..,..,..	..,..,.., 1,..,35	.., 1,..,..,22,..
E 5	3, 1,.., 4, 4,..	1, 4, 3, 0, 4,..	0, 4,25, 0, 2,14	1, 3, 4, 2, 6,11	7, 5, 1, 1, 2, 9	4, 5, 7, 8, 5,13
F 3	.., 6, 6, 1, 2,..	7, 7, 2,13, 8,..	4, 8,.., 4, 1, 3	5, 5, 3, 6, 1, 5	5, 3, 1, 2, 5, 1	2, 5, 0,11, 2,..
M B 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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D 4	..,..,..,..,..,..	12, 3,..,..,..,..	..,13,..,..,..,..	49, 2,..,..,..,..	8,14,..,.., 0,..	..,..,19,..,..,27
10	..,..,..,..,15,..	..,24,..,..,..,..	..,.., 7,10,..,..	13, 3, 5,.., 7,..	..,16,.., 8,..,..	..,16,..,..,14,28
E 3	5, 2,10,.., 8,28	5, 2, 7,.., 2,..	9,11, 4,10, 5, 0	11,13, 2, 1, 6, 2	13, 6, 6, 8, 4, 1	10, 6, 4, 9, 3,24
4	6, 7, 4,23, 5, 6	7,11, 1, 1,15, 8	8, 1, 0, 2, 8, 8	3, 4, 1, 2, 6,10	6, 0,10, 0, 2,..	2, 9, 5, 2, 7, 5
6	7, 0,..,..,12,31	4, 5,18, 5,11,18	4, 5, 8, 1,10, 9	0, 2, 8, 4, 4, 0	2, 1,10,.., 1, 4	.., 8,17, 2, 4,..
7	1, 2, 6, 4, 4,14	6, 9,..,..,16,22	5, 4,.., 2, 7,18	1, 3, 8, 4, 9,14	0, 4, 3, 0, 3, 4	15, 7, 7,.., 2,..
F 2	0, 5, 2, 4, 4, 1	1, 1, 1, 2, 0, 2	3, 3,.., 3, 1, 8	6, 2, 6, 2, 0, 0	1, 2,.., 2, 2, 6	9, 1,12, 6, 5, 2

Region.	H. A. 44. Magn. B.	H. A. 44. Magn. 4.5.	H. A. 44. Magn. 5.0.	H. A. 44. Magn. 5.5.	H. A. 44. Magn. 6.0.	H. A. 44. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	3, 6, 5, 2, *2*, 3	..,*18*,.., 2, 0,..	.., *1*, 3, *3*, 1, 1	.., 7, *4*, 3, *5*, *3*	.., 4, *2*, 4, *3*, *6*	.., 1, 1,*11*, 4, *7*
B 4	.., 1, *3*, *2*,.., 2	..,12, 3,.., *3*,..	.., 8, *2*, 6, 4,..	7, *2*,*12*, 4, *2*, *4*	.., 6, 4, 1, 2, *1*	.., *2*,.., 4, 3,..
5	.., 6,..,.., *2*,..	..,.., *6*, 5,..,..	.., *1*, *4*,.., *1*,..	.., 2, *2*,*23*, 0, *9*	.., *1*, 3, 1, 2, *7*	.., *1*,12, 2, *1*, 3
6	*6*,..,*18*, 1, *3*,..	.., *2*, 6,..,..,..	.., *9*, *4*, 2, *3*, 2	*13*, *8*, 9,.., *2*, *2*	.., *2*, *8*, *4*, *3*, 2	.., 6, *3*, 6, *4*,..
7	6, *8*,.., *6*, *3*, 6	.., 0,*15*,.., 8,..	.., 1,15, *9*, 0, *2*	*1*, *5*,*18*, 0, 1,22	.., *3*,.., *1*, *2*, 3	*5*, *5*, *6*, 0, *6*,*10*
C 6	4, 7,12, 8,.., *9*	.., *2*,12, 3,.., *3*	.., 1, *7*, *1*, 5, 0	.., *3*,18, 1, 4, 2	5, 5, 4, 4, *1*, 0	.., *2*,16, *1*, 6,..
7	..,..,.., 0, *8*, 6	.., *2*,.., *4*,*16*, 1	.., *7*, *7*, *2*, *2*, 4	.., *1*, 3,11,*13*, *8*	*6*, *4*, *5*, 7, 0, *9*	.., 0, 4, *7*, *6*,..
8	.., *6*, *7*, *9*, *2*,..	.., *5*,.., 7, 1, 1	.., *4*, *7*, *1*, 6, 7	.., *8*, 0, *7*, 2, 6	.., *1*, 7, *8*, 0, *7*	.., 2, 8, 1, 5,..
9	*2*, *6*, *6*,.., 1,..	2, *7*,..,.., 0, 2	1, *7*, *8*,.., *3*, *1*	0, *5*,*10*, 2, *4*, *6*	.., *4*, 1, *4*, *6*, 2	.., *3*, *2*, *4*, *6*,*16*
D 6	..,11,..,.., 1, *3*	.., 9, 4,..,13,..	*9*,13,.., 6, 7, 2	12, 2, 9,17, 2, *6*	.., 1, 1, 6, 0, *1*	.., 2, 4, 1, 2, 0
7	*8*, *4*, 5,.., 4,..	..,*12*,*10*,..,..,..	*1*,.., *2*,.., 7, 8	9, *6*,11, 2, 5,..	.., *3*, 1, *3*, 0,*11*	.., *6*, *6*, *5*, *7*,..
8	*3*, 2,.., *5*, 4,21	*6*,*20*, 1,.., 0,..	*7*, 2,*19*, *3*, 1,15	*5*, *6*, *8*,*13*, 0, *5*	.., *6*, *4*, *1*, *3*, *5*	..,*12*,..,11, *4*, 4
S C 1	*7*, *6*, 7, 0, 5,..	.., 0,..,.., *4*, *3*	..,.., *8*,.., *6*, 0	*11*, 3, *3*, 2, 0, *7*	1, *4*, 0, 2, *1*,..	.., 0,*10*, *4*, 0, *9*
2	2,*10*,..,.., *3*, 2	*3*, *3*, *3*,.., 4,..	1, *1*, *4*,.., *3*,..	7, 0, *5*, *2*, 6,..	0, 2, *3*, *7*, 1, 1	.., *2*, *4*, *3*, *5*,..
12	*27*, *4*,.., *1*, *2*,15	*18*,..,*12*, *2*, 4,..	*10*, *6*,..,.., 2, *8*	*12*, 0, *3*,.., 1, 2	.., *1*,*10*, 2, *6*, 0	.., 2, *6*, 4, 1, *5*
D 1	..,..,..,.., 5, 7	*4*,..,..,.., *6*,15	.., *7*, *1*,..,*10*, 6	.., *6*, *7*,.., *1*, *3*	.., *5*, 6,*10*, *2*, *1*	.., *4*,.., *7*, *5*, *6*
2	6, *4*,.., 0, 2,11	*2*,*12*,.., 2,..,19	*1*, *4*, *4*, 4, 4,..	*12*, *4*, *2*, *2*, *1*, *2*	.., *3*, *8*, *3*, *1*, *8*	.., *5*, *2*,11, 1, 2
11	.., *9*, *6*, *2*, 3, *3*	*7*,..,.., 8, 2,19	*9*, *5*, *7*,.., *6*,..	*7*, 5, 6, *3*, 5, 7	*2*, *4*, *4*, *5*, *3*, *5*	.., *7*, *4*, *8*, *2*,..
12	*9*, *6*,.., *7*, *2*,14	6, *9*,..,.., 4,14	*15*, *1*, *4*, *1*,*12*, 8	*8*, *2*, 6,.., *1*,..	.., *2*, *8*,*10*, *4*, 7	.., 2,*17*,*20*, *1*,..
E 1	..,*12*,..,.., *6*, *8*	..,*25*,..,..,*17*,..	..,*10*,..,*18*, 1, 3	.., *8*,*10*, *3*, 1,..	..,*10*, *2*, *4*, *2*, 2	..,..,*30*,..,12,*17*
2	.., 1,..,.., 8, 9	..,.., 8,.., 4,..	*6*, *6*, 3, 2, 0,..	..,.., *8*, 4,11,..	..,*10*, *6*,.., 2,16	..,*12*,..,..,..,..
8	6, 1,..,.., 8,..	*1*,..,21,.., 6,..	.., *8*, *1*, 1, *1*,14	*1*, *7*, 5, 2, 8, *2*	*4*,*12*,*12*,*10*, 5,15	..,*12*,..,.., *2*,..
9	*6*, *4*,..,.., *2*,*10*	.., *2*,..,*12*, 9, 2	1,*15*,.., *1*, *1*,18	.., *4*, *1*,.., 8, 6	*6*,*22*, *4*, *7*, 1, *2*	..,..,*11*, *4*,..,*17*
F 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
P A 1	*2*, *1*,.., 8,..,..	4, 3, 1,.., 7, 5	*1*, 5, *2*, 6,11, 7	8, 3, *3*,10, 0, *1*	.., *2*, 2, *4*, 4, 1	.., 1, *4*, 9, *1*,*12*
3	*1*, 2, 3, *2*, 5,..	.., 4, *2*,.., 5,..	*6*, 4, *2*, 1, 2, 8	6, 4, 0,.., *1*, 4	*5*, 2, *1*, *3*, *2*, *2*	.., 4, 1,.., *4*, *3*
B 1	*4*, 2, *8*, 1, *4*,*11*	6, 2, 8,..,..,..	4, *3*, 0, *4*, 1, *8*	5, 0,*11*, 1, *2*, *4*	.., *3*, *9*, 1, *1*, 7	*10*, *2*, *2*, 3, *4*,..
3	.., *7*, 3,.., 5,..	.., *1*,..,.., 3, *2*	3, 5,11, *9*, *2*,*17*	14, *2*, 3, *8*, 0, *2*	.., 1, *5*, *2*, *1*, 2	.., *1*, *2*, 4, *2*,..
C 3	*9*, *6*, 1, *2*, 4, 2	2, *5*,*11*, *4*, 3, *3*	2, 1, 1, *3*, 0,*25*	*4*, *4*, *6*, 3, *2*, 7	4, *3*, 2, *2*, 1,20	.., *5*, 2,..,*13*,..
5	.., 0,.., *4*, *5*,..	4, *6*,*14*,.., *1*,12	20,*10*, 6,23, 4, 0	.., 5, 4, 7, *9*, *8*	.., 7, 1, 4, *3*, *2*	.., *1*, *1*, 7, *3*, *2*
11	*2*,.., *8*, 1, 5,..	.., 0,.., *2*,*12*,..	*2*, *4*, *4*, 1, *2*, *6*	.., 0, 1, *7*, *4*,*17*	4, 0, 0, *6*, *2*, *8*	.., 0, *6*, *1*, 0, *2*
D 3	*6*, *8*, 4, 4, 7, 7	*7*, *4*, 1,.., 1, *3*	*5*, *2*, *7*, 0, 1, 7	*8*, 1, *4*,*12*, 1,11	*6*, *1*, 1, 4, 1, *9*	1,12, *6*,*19*, 2, *2*
5	.., 3,.., 7, 1,..	2,*10*,.., *3*, 3,..	6,*11*, 2, 4, 0, 5	2, *1*, *2*, 0, *3*, 7	6, 3, 2, *6*, 1,..	.., 6, 5, 3, 0, 2
9	*7*, *3*,*12*,.., *2*,18	*14*, *7*,*10*, *9*, 4,..	*12*, 1,*11*,20, *4*,..	*5*, *8*, *2*, 7, *4*, 8	*9*, *6*, *4*, *7*, *2*,..	.., *6*, 1, *4*,14, *4*
E 5	.., 4,..,.., 1,..	.., *8*, *1*,..,11,..	4, *6*,*12*, 0, 4,16	*20*, *7*, *6*,.., 8, 9	7, *3*, *3*, *5*, 6,..	.., *7*,*14*,18,..,..
F 3	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
M B 2	*4*,..,.., *1*, 0,..	*9*, *5*,*14*, 4, *5*,*20*	*1*, *1*, 1, *2*, *1*,..	*2*, 1, *4*, *7*, 2,..	*10*, 0, 2, *3*, *3*,*11*	.., 2,*15*, *1*, *4*,..
8	.., *2*, 1, 0, 1, *7*	*4*, *8*, *5*,*10*, 8, *1*	1, 4, 1, *3*, 1,..	0, 1, *1*, 4, 1, 2	1, 1, *2*, 2, *4*, 6	*9*, *6*, *7*, *2*, 0,16
9	*14*, *5*, 0,.., 5,..	*10*, *3*, *9*,*11*, 2,..	2, *1*, 6,19, 4, 1	4, 1, *1*, *1*, *1*, 0	6, 0, *2*, *2*, *1*,..	.., *2*, *8*, *6*, 3,..
C 4	6, 0, 3, 2, 4, 0	9,*14*, *9*,.., 4,..	*11*,10,.., *1*, 1, 3	14, 5, 9, 2, 0, *3*	10, 1, 1, 4, *1*, *1*	10, 6, 1,*12*, 4, 1
10	.., *7*,*10*,.., *1*, 6	*12*,*16*, *7*, *4*, *4*, *6*	*10*, *6*,*11*, *4*, 4,..	*18*, *4*, *7*, *2*, *4*, *2*	*6*, *4*, *2*, 0, *2*,..	.., 0,*10*,*10*, *7*,..
D 4	4, *5*,..,13,10,24	*6*, 3,..,12, 4, 0	*2*, *2*,.., *4*, 4, *4*	*1*, *1*, *7*, 0, 5, 4	*6*, 0, *4*, 0, *6*,*10*	2, 3,17, 4, *1*, 2
10	*12*, *4*, 6,.., 4,..	2, 6, *2*, 1, 0, *1*	*10*, *7*, *9*, 2, *4*, *2*	*13*, *9*,*11*, *7*, *8*, *5*	*11*, *2*, 0, *3*, *1*, *4*	.., *4*, 3, *3*, *6*,10
E 3	*6*,..,..,.., 8,25	6,..,*14*,.., *2*,..	4, 0, 2,14,12,..	*5*, 0, 0,11, 7, 9	*2*, 0, 7,.., 8, 7	4,*18*,..,..,20,..
4	8,13, *6*, 2, 6,15	..,.., *9*, 2, 3, 5	*19*, 1,.., 3, 5, 4	*20*, *9*,.., *8*, 2,27	..,*29*,*13*,..,22,..	..,..,..,..,..,..
6	5, *5*,..,..,15,22	0, *5*, 7, *2*, 1, *2*	*1*, *4*, 6, 7,20,..	*15*,*14*, 7,.., 5,..	*4*, *9*,*15*,..,.., 3	..,..,*13*,..,..,..
7	7,*14*, 5, *2*, 2,22	*2*,..,..,..,14,20	*2*, *7*,..,.., 1, 6	5, *6*, 0, 6, 8,16	*7*,*18*, 4,.., 9, 4	..,..,..,.., 2,..
F 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..

Region.	H. A. 45. Magn. B.	H. A. 45. Magn. 4.5.	H. A. 45. Magn. 5.0.	H. A. 45. Magn. 5.5.	H. A. 45. Magn. 6.0.	H. A. 45. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	.., 0, *3*, 3, 0, 2	.., 2,.., *2*, *8*,..	.., 0, 4, *6*, 3, *2*	..,10, 3,10, *5*, 8	.., 0, 2, 7, 1, 3	.., *1*, *2*, 5, 1, *8*
B 4	..,*10*, *5*, *3*,.., 9	.., *3*, *2*,.., 4,..	.., 0, *8*,..,*10*,..	.., 1, *4*, 6, *3*, *6*	.., 0, 6, 3, 1, 6	.., *3*,10, 2, 0,..
5	..,*24*,..,.., 3,..	..,.., 0, *3*,..,..	.., *2*,11,.., *3*,..	.., 2, 7,.., 0,..	.., *2*, 0,.., 2, *2*	.., 3, *9*, 1, 1, *5*
6	..,.., *3*,*20*,14,..	..,*25*, 2,..,..,..	.., *5*, *2*,.., 9,..	14, 9, 6,.., *2*, 4	.., 7,17,13, 0,17	.., *4*, 8, *4*, 4,..
7	*10*,..,.., 4, 0,..	.., 2,..,..,..,..	..,*10*, *5*, 2, 4,..	28, 4, 6, *6*, 3,..	.., 4,..,.., 1, 6	12, 2, *2*,12, 2,..
C 6	2, *3*,*26*,..,..,..	.., 9, *4*, *5*,..,..,	.., *8*, 2, 7, 4, 1	.., 1,.., *2*, *1*, *6*	.., *4*, 2, 0, 2, 0	.., 5,.., *1*, *1*,..
7	..,..,..,.., *5*,..	.., 8,..,..,..;11	.., 1,.., 0, *2*, *1*	*11*, *4*, *9*, *4*,..,..	7, 2,16, 9, 1,10	.., *1*, *8*, *2*, 4,*22*
8	..,..,..,*19*,..,..	..,..,..,..,14,..	.., 3,20, 2,..,..	.., 0, 3, *2*, 2, *4*	.., *1*, 8, *8*, 5, 0	..,.., 4, *2*, 2,..
9	.., 2,..,..,..,..	..,..,..,..,..,17	..,..,..,.., *9*,..	*2*, 3,..,.., 3, *8*	.., 0, 1, *8*, *2*, 0	.., 1, 0, 2, *1*,..
D 6	..,*12*,..,.., *4*, 1	..,*10*, 0,..,..,..	.., *6*,.., 4, *2*,*11*	*2*, *4*,.., *8*, *2*,*11*	.., *2*,.., 8, 1, 8	.., *2*, 3, 2, 1, 2
7	..,.., 7,.., 2,..	..,..,..,..,..,..	..,.., 1,.., 0,..	*8*, *6*,*10*, *8*, 2,..	.., 1, 2, *4*, *2*,..	.., 1, 4, 6, 0, *4*
8	1,*22*,..,..,15,..	*11*,*13*,..,..,10,..	*4*,*16*,..,.., *1*,..	*16*, *3*,*10*, 5, 2, *2*	.., 2,21,.., 1,..	*11*, 1, 4, 0, *1*,11
S C 1	..,13,..,..,..,..	.., *4*,..,.., *4*,..	..,.., *1*,..,*11*,..	.., *8*, *1*,.., 7, 0	.., *4*, 6,.., 0,..	.., *2*, *4*,*10*, *4*,..
2	*7*, *2*,.., 1, 5,..	5,..,..,.., *1*,..	1, *2*,..,.., 6,..	*3*, *4*, 5, *2*, *3*,..	*8*, 3, 6, *6*, 7, 4	.., 0, *2*, *4*, *3*,..
12	..,..,.., 1, 0, *9*	..,..,..,..,..,..	4, *4*,..,.., 7,..	..,11,..,..,.., 7	.., *1*,.., *4*, 1,..	.., 0, *2*, *2*,*10*,..
D 1	..,..,..,.., *1*, 9	*11*,..,..,..,10,..	.., 0, *3*,..,..,*14*	.., *4*,..,.., *6*, 0	.., *9*, *9*,*10*, *6*,*12*	.., *6*, 1, *5*, *6*, *5*
2	*14*,..,..,..,..,..	..,..,..,*13*,.., 6	.., *3*, *5*, *2*,..,..	*6*, *3*, 0,..,..,..	.., 4, 1, *1*, *1*,..	.., *6*,*10*, 1, *2*, *7*
11	..,*10*,.., 1,..,..	0,..,..,.., 6, *2*	*7*, 0, *5*,.., *1*,..	*2*, *6*, 0, 7, *6*, 0	.., *6*, 0,*11*, 4,12	.., *2*, *3*, *1*, *8*,24
12	..,..,..,..,.., *3*	.., *2*,..,.., 0,..	*5*,..,..,..,14,13	*4*, *7*, *2*,.., *6*,..	.., 5,.., *3*, 1, 5	..,*12*,*10*,20, *3*, *6*
E 1	..,*21*,..,.., 4,12	..,*36*,..,..,24,28	.., *9*,.., *2*,..,14	..,*11*, 5, 0, 6,..	..,*16*, *7*, 8, 3,10	..,*16*,*14*, *5*, 4, 8
2	.., *4*,..,.., 0,16	..,..,*15*,.., 3,..	*6*, *3*, *3*, *8*, 2,..	..,.., *6*,12,11,..	*9*, *8*, *4*,23,12,..	*13*, *9*, *3*, 2,13, 6
8	*9*, *9*,..,..,14,..	*14*,.., 0,.., 4,..	.., *7*,*14*, 0, *1*,16	*7*,*12*, *4*, 4, 3, 4	*21*, *9*, *8*, 2, 4, 8	*18*,*18*,*14*, *9*, 4,10
9	47, *2*,..,.., 2,26	.., *5*,.., 0, 3, 3	*13*, *4*,.., *5*, *4*, 8	..,*10*, *7*,.., 3, 2	*3*,*10*, 0, *7*, 4, 3	4,*10*, *8*, 4, 6, 1
F 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
P A 1	*3*,..,..,..,..,..	*3*, 3, *1*,..,.., *3*	9, 4, 0, *4*, 2,..	*1*, 4, 8,.., 0, *5*	.., 4, 4,.., *2*, *4*	.., 3, 5, 6, 2,..
3	0, 4, 3, 5, 0,..	.., *3*, *2*,.., 2,..	5, *2*, 7, 5, 4, *4*	*11*, 2, 2,.., 0, 1	.., *1*, 3, *4*, 2, 1	.., 1,15, 0, 1, *4*
B 1	*3*,.., *2*, *2*,16, *4*	*12*, *7*, 1,..,..,..	*1*, *2*, 2, 8, *2*, *4*	4, 1, 1,*11*, 3, 5	.., 2, *1*, *5*, 4,21	*14*, *3*, *1*, 0, *1*, *3*
3	.., 6,..,..,..,..	.., *1*,..,..,*12*,13	*16*, *1*, *4*, *5*, *6*, *5*	.., 6, *6*,14, 3, 6	.., 5, 3, 2, *1*, 2	.., *2*,.., *5*, *4*, 9
C 3	.., 7,.., *6*, *9*,..	3, 2,.., *7*,*12*,18	*10*, 0, *2*, 0, *2*,..	15, 4, 5,*10*, *4*,*13*	*4*, *3*, 6,.., *2*,..	.., *2*, *6*, 8, *2*,..
5	.., 2,.., 0, 4,..	.., *6*,..,.., *1*,..	*13*,..,..,11, *4*,13	.., *6*, *1*, *4*, 8, *6*	.., *6*, *6*, 1, 4, *4*	.., 0, 9, *5*, *7*,..
11	..,.., 9,.., *6*,..	..,..,.., 2,..,..	*10*, 4,..,..,11, 5	.., 2, 0, *5*, *8*,..	*18*, 4, *2*, 0, *1*,..	.., *1*, 0, *1*, *4*,*12*
D 3	*6*, 3, *5*,12,..,..	*13*,..,..,.., 4,15	*1*,*11*, *5*,*21*,18,..	6, 1, 3,.., 8, 8	*3*, 2, *7*, 1, 1, 9	*1*, 2, *2*, 6, *3*,..
5	..,..,..,..,..,..	*6*,..,.., *8*,..,..	*5*, *4*,.., *4*, 1, 6	*6*,*10*, 7,.., 8, *3*	*4*, 0, 3, *2*, *3*,..	.., 2, *2*, *8*, *5*,..
9	*1*,..,..,..,.., 8	*5*, *4*, *6*, *8*,..,..	.., *4*, *5*,.., *4*,..	..,*11*, *3*, *8*, *1*, 9	.., *4*,*17*, *3*, *5*,34	.., 2, 0, *3*, 2, 4
E 5	.., *2*,..,.., 5,..	.., *4*, 3,.., 6,..	*12*,*11*, *2*, 0, 9, 9	*10*, *5*, *3*,.., 3,15	*14*, *8*, *5*, 0, 4, 8	..,*12*, 0, *8*,10,15
F 3	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
M B 2	*8*,..,.., 1, 5,..	4, 4, *3*, *5*,21, 8	5, *4*, 3, 0, 4,..	4, *3*, 2,.., *4*,..	*1*, 2, *5*, 8, 4, *5*	.., *1*, 0, *6*, *2*, 1
8	.., *2*,*14*,.., 2,13	6, 6,.., *2*, *6*,..	1, *6*, 1,.., *4*,..	7, *3*, 6, *5*, 1, *4*	8, *4*, 2, 0, *1*, 9	1, 0, 2, 0, 0, 0
9	..,.., 0,.., *6*,..	1, *2*, 0, 8, *3*,..	1,.., *6*,11, *3*,..	1, 0, 2, 0, 6,*11*	.., *2*, 0, *8*, *4*,..	.., *1*, *6*, *2*, *5*, *1*
C 4	*3*, 1,*17*, *3*, *8*,..	*20*,22,..,.., *3*,..	.., *3*,.., 0, 1,..	12, *5*, 1, 4, 6, 7	.., 1, *5*, 0, 3, *5*	*8*, 5, *1*, 2, 5, *8*
10	.., *6*,..,.., 3,..	.., 1,*11*,17, 3,..	*1*, *2*, *1*, *3*,..,..	*15*, 1, 0, *2*, 1, 0	*3*, 2, *4*, *6*, 5,..	.., 0,*10*, *4*, *1*,15
D 4	..,..,.., 4, *2*,22	1, 2,.., *2*, *4*, 2	2, 5,..,12, 6,14	2, 8,10, 5, 6,14	*4*, *5*, 1, 8, 6,*12*	.., *1*,*15*, 3, 3, 7
10	..,..,..,.., 5,..	*14*, 9,*14*,.., 7,..	4, *1*,.., *4*, 2, 6	8, 1, 0, *6*, *1*,12	3, *3*, *2*, 4, 0, *6*	.., *3*, 2, 0, 9, 9
E 3	*6*,..,..,.., 8,18	*4*,..,..,..,15,..	*4*, *8*, 5,10, 8,..	*4*, *5*, *2*, 8,10, 6	*9*, *9*, *1*, *3*,16,19	*9*,*11*, *1*,16,12, 7
4	17, *4*, 4,24, 6,15	..,..,10, *1*,15,15	*4*, *5*,.., 1, 9, 2	*6*, *8*,.., 0,11, 6	*14*,*15*, *5*, 0, 4,20	*12*,*11*,*12*, 6,10, *2*
6	2, *2*,..,..,14,13	*6*, *5*, 5, 3,19, 7	*9*, *8*, 1,.., *1*,..	*9*, *3*, *3*,.., 2,..	*9*,*12*, *4*, 4, 5,14	..,*11*, 1, *5*, 7, 1
7	*8*, *5*, *7*, *2*, 5,16	*12*,..,..,.., 8,11	*9*, *2*,..,..,10, 5	*8*, 2, *8*, *3*,12, 3	*10*, *8*, 0, *6*, 0, 5	*6*,*12*, *6*, *2*, 9,10
F 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..

Region.	H. A. 46,1. Magn. B.	H. A. 46,1. Magn. 4.5.	H. A. 46,1. Magn. 5.0.	H. A. 46,1. Magn. 5.5.	H. A. 46,1. Magn. 6.0.	H. A. 46,1. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
B 4	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
5	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
6	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
7	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
C 6	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
7	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
8	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
9	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
D 6	..,..,..,.., 0, *8*	..,11,..,.., 5,..	..,12,.., 8, *5*, *5*	19,14, *1*, *5*, *6*,..	.., 6,12, *6,18*,..	.., 0,..,..,..,..
7	8,16, 2,..,*14*,..	..,20,12,..,..,..	..,.., 1,.., *8,18*	..,16, 6, *5,10*,..	..,20,.., *6*, *6*,..	..,..,..,..,..,..
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S C 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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P A 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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D 3	10, 7, 3, 0,*12,19*	10, 1,..,..,*15,18*	15, 9, 0, *4,10*,..	16, 4, 3,..,*16,31*	.., 6,*10*,..,*16*,..	.., *3*,..,..,..,..
5	.., 7,.., *4*, *7*,..	14,..,.., 6, 5,..	..,20,.., 4, *4,19*	0,14,.., *6*,.., *8*	21,18,..,.., *4*,..	..,..,..,.., 4,..
9	9, *1*, 3,..,14,*30*	14,15, 8, 2, *4*,..	*3*, *2*, 7, 0,*11*,..	..,14, *5*, *4*, *8,24*	..,10,20,12,*13*,..	..,..,..,..,..,..
E 5	3, 4,.., *4*, 2,..	0,16,13, 0, *2*,..	1,10,*11*, 2, *6*, *8*	5, 5, *1*, 2, *6,10*	8, 9, 6, 6, *2*, 0	4,12, 2, *2*, *4,12*
F 3	.., 6, 7, *1*, 2,..	8, 7, 2,14, 8,..	*4*, 7,.., *4*, *1*, 3	6, 5, 2, 6, 1, 5	4, 3, 1, *3*, 5, 1	2, 5, 0,11, *2*,..
M B 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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D 4	2, 5,..,*22,16,42*	13, 9,.., *3,11*,..	12, 2,.., 1,*16,16*	1, 6, 8, 0,*18,22*	*5*,16,.., *2*, *3*,..	..,..,..,..,..,..
10	.., 6,..,..,*15*,..	..,28,22,.., 2, *8*	17,20, 3,*15*, *4*,..	*4*,10,10,12, *5,20*	..,14,20,10, *9*,..	..,..,..,..,..,..
E 3	3, 1,10,.., *6,23*	7, *1*, 7,.., 0,..	6, 1, 0,*12*, *2*, 0	6, 5, 2,*10*, *8*, *9*	8, 0, 0, *2,12,11*	7, 6, 2,*14,10,16*
4	2, 1, 5, *4*, *4*, *2*	7,11, 6, 2, 4, *4*	4, 2, 0, *2*, *1*, 3	4, 5, 0,10, *1,18*	0,12, 3, 0, *4,20*	6, 8, 9, *6,11*, *1*
6	2,*11*,..,.., *2*, 2	10,22, 6, 2,10, 2	9,14, 8, *2*, 6, *9*	18, 7, *3*, 3, *5*, *1*	6,11,12, *3*, *4,15*	..,11, 2, 2, *4*, *1*
7	13, 9, 6, 8, 3, *1*	11, 9,..,.., 3, *2*	17,17,.., 2, 0, 8	10,11,14, 7, *2*, 3	5, 9, 5, 5, 1, 3	*3*, 8,11, 2, *6,10*
F 2	*1*, 5, 1, 5, 4, 1	*1*, 0, *1*, 2, *2*, 2	3, *2*,.., 4, *1*, 6	6, *2*, 6, *1*, 1, 0	0, 2,.., *2*, 2, 6	*9*, *1*,11, 6, *5*, *3*

Region.	W. Herschel. Magn. B.	W.Herschel. Magn. 4.5.	W.Herschel. Magn. 5.0.	W.Herschel. Magn. 5.5.	W.Herschel. Magn. 6.0.	W.Herschel. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F B K M
N A 2	4,16,25, *2*, 0, 3	..,16,..,16,18,..	..,.., 7, 3,15, *2*	..,*26*, 8, 8, *5*,*15*	..,*92*, *2*,18,..,..	..,*49*,..,..,..,..
B 4	..,12, 4, 6,.., *8*	..,*22*,23,.., 8,..	.., *7*,11,21,..,..	10, 8,20,22, 0, 4	..,*11*, 2, 3,12,..	..,*12*,.., *6*,19,..
5	..,16,..,.., *2*,..	..,..,34,28,..,..	.., 1,15,..,22,..	.., 6, 0,14,11,24	.., 8,*12*,..,*12*, 9	..,*24*,*15*, *2*,*24*, *4*
6	14,..,47,14, 2,..	..,12,10,..,..,..	..,10,*22*,14,.., 9	*6*, *5*, *8*,..,*26*, *7*	..,.., 4,..,..,..	..,..,..,..,..,..
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C 6	20, 9, 3, *2*,.., 0	.., *6*, *6*, 6,.., 2	.., 4, 2,18,*12*,28	.., 3,*13*, 8, *6*, *4*	*16*, *1*, 5, *5*, *2*,*28*	.., 1,*21*,12, 2,..
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D 6	.., 3,..,.., *4*, 4	.., *2*, *8*,.., 3,..	10,13,..,18, 0,63	*8*, *8*,.., *4*,15,..	..,14,..,*16*,*41*,..	..,11,..,..,*30*,..
7	2, 2, 2,..,11,..	.., 6,*17*,..,..,..	*7*,..,24,..,27,22	*5*, 8,.., 7, 2,..	.., *5*, *6*, 7,15, *6*	..,*17*, 4,..,..,..
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S C 1	7,*40*,28,20,*52*,..	..,78,..,.., 8,55	..,..,13,.., 8, *4*	*21*, 2, 4, *5*, 2,21	54, 2, *2*, *8*, *3*,..	..,*26*,..,*30*,10,*31*
2	*10*, 2,..,..,*22*,38	19,16,*16*,..,19,..	*13*, *2*, 2,..,20,..	*10*, *1*, *8*, *6*, 4,..	*2*, 7,*14*, 6,*10*,*13*	*21*,*42*,.., 0, *2*,..
12	14,18,.., *2*,*18*, *3*	19,.., 9, 1,18,..	6, 1,..,.., 7, 1	*18*, *3*,*13*,.., *1*, *1*	..,*13*,*16*, 8, *2*, *3*	..,*17*, *1*,..,*17*,..
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12	2,16,..,*19*, 2,21	0, *7*,..,.., 4,*11*	5,*12*, 6, 4, *8*,16	5, *5*, *8*,..,12,..	.., *4*,*17*,*26*, *1*,..	.., 7,24,.., 4, *4*
E 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
2	..,*29*,..,..,*13*, *6*	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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9	..,..,..,..,..,..	.., *3*,..,..,72,..	..,*09*,..,49,..,..	..,..,..,..,..,..	..,27,..,..,..,..	..,..,..,..,..,51
F 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
P A 1	51,54,.., 1,..,..	*18*, 9,..,..,..,..	*11*,..,..,.., *6*,..	*4*, 0,..,.., *5*,*10*	.., *4*,*18*,..,*10*, 2	..,*23*,..,..,11,..
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B 1	20, *3*,20, *7*,*26*,*15*	11, 2, *7*,..,..,..	4, 5, *3*, *5*, 3,15	*19*,*10*,*20*,*19*, *9*, *4*	..,*23*,..,*15*,*20*,..	..,*14*,..,*26*,..,..
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C 3	13,11, *2*,14, 2,*42*	2,22,16, *2*, 6, 7	18, 4, 6, 2, 9,13	3, 1, 1,*10*,*13*,*27*	*31*,*21*,*11*,.., 6,*14*	..,*19*,*85*,*45*,..,..
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D 3	7,12, 1,14,*21*,16	2, *4*,*15*,.., *4*,26	*26*,*25*,25,*28*, *4*,*32*	8,*16*,*17*, *9*,*60*,20	..,*15*, *7*,.., 3,..	..,.., *8*,..,..,..
5	.., 5,..,*28*, 2,..	*7*, 7,.., 7,24,..	4,18,..,*18*, *9*,..	*15*, 5,..,10, 7, 0	..,*13*,..,.., *1*,..	.., *8*,..,..,*20*,..
9	21,*13*,..,.., *2*, *4*	0,.., 8, *3*,*10*,..	5,19,..,..,*14*,..	.., 1,*16*,..,*25*,..	*16*,..,23,27, 0,..	..,*13*,..,..,..,..
E 5	..,..,..,..,98,..	..,30,..,..,..,..	72,..,..,..,.., 7	..,..,..,..,.., 4	..,..,..,*11*,33,..	..,..,*19*,..,..,..
F 3	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
M B 2	21,..,.., 3,*13*,..	1,28,13, 6,*15*, 3	7, 4,16, *5*, 4,..	0, *8*,*14*,.., *1*,..	..,*56*, 0,*50*,..,..	..,..,..,..,*27*,..
8	..,19, *2*, 4, 5, *2*	*3*, 8, *6*, *8*, *9*,14	1, *4*, *4*, *3*,*12*,..	*28*, 4,*22*,.., *5*, *5*	*17*,*20*,*57*,.., *9*,..	..,15,..,*20*,..,..
9	7,30, *3*,.., 9,..	7, 0, *2*, 2, 0,..	4,32, 3,*15*, 2, *2*	*25*,*11*,..,.., 0,*34*	*22*, *3*,*16*,..,17,..	..,..,..,..,..,..
C 4	38,11, 4,13,16, *9*	2,43, 0,.., 1,..	8, *2*,.., 0, 4, 6	*9*, *2*,*12*, *8*, *1*,*23*	.., *5*,*14*, *2*, *1*, 9	14,*12*,*73*,*34*, *6*,..
10	.., 3,35,.., 6,*12*	49,18,16,17, 3,47	11,40,*10*, 2,17,..	*18*,*14*, *3*, *5*, *2*,11	*22*, *6*,.., 4,*12*,..	..,*42*,*37*,*69*,..,..
D 4	*1*,23,.., 2,18,*28*	*4*,*10*,..,18,*10*,15	12, *8*,.., *7*,*18*,*52*	.., *2*,15, 5, *4*, *1*	..,*35*,..,..,*41*,18	..,..,*52*,..,..,..
10	31,*12*,12,.., 6,..	22,44, 6,*17*,38,10	*4*,*22*,14, 4,18,10	*11*, 4,14,.., 2,19	8, *8*,14,21, *5*,..	.., 9, *4*, 4,..,..
E 3	1,..,..,..,42,..	..,..,..,..,..,..	*26*,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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6	..,*11*,..,..,..,..	..,..,..,34,17,..	*19*,..,*35*,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
7	0,95,..,..,43,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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Region.	J. Herschel. Magn. B.	J. Herschel. Magn. 4.5.	J. Herschel. Magn. 5.0.	J. Herschel. Magn. 5.5.	J. Herschel. Magn. 6.0.	J. Herschel. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 3	..,..,..,..,*14*,*22*	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
B 4	..,..,..,..,..,*21*	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
5	..,*2*,..,..,*12*,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
6	5,..,6,..,*13*,..	..,*34*,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
7	..,14,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
C 6	19,2,..,*26*,..,..	..,*12*,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
7	..,..,..,7,*13*,*15*	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
8	..,*5*,..,8,*4*,..	..,..,..,24,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
9	..,0,7,..,*6*,..	27,..,..,..,..,..	..,..,*6*,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
D 6	..,*2*,..,..,*12*,6	..,*6*,*16*,..,0,..	..,*17*,..,..,*3*,..	..,..,..,..,..,..	..,..,..,..,*7*,..	..,..,..,..,..,..
7	*4*,*14*,2,..,*22*,..	..,..,23,..,..,..	..,..,..,..,..,..	0,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
8	3,*32*,..,*3*,8,*14*	2,*24*,11,..,*8*,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
S C 1	*13*,*13*,40,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
2	26,11,..,..,*6*,*7*	17,*3*,17,..,*20*,..	*27*,..,..,..,..,..	..,..,..,..,18,..	..,..,..,..,..,..	..,..,..,..,..,..
12	..,*14*,..,..,..,*8*	*13*,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
D 1	..,..,..,..,5,*4*	*13*,..,..,..,..,..	..,12,19,..,8,16	..,3,22,..,15,*16*	..,..,13,*19*,*3*,3	..,..,..,*80*,..,..
2	12,8,..,2,2,2	*12*,*5*,..,*4*,..,1	*1*,*8*,*4*,*19*,*1*,..	0,*5*,*28*,*5*,4,..	..,*35*,..,..,*22*,..	..,..,..,..,..,..
11	..,*10*,1,*10*,*13*,..	22,..,..,*30*,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
12	0,*16*,..,*24*,5,*2*	*1*,*7*,..,..,*19*,*5*	..,2,..,*16*,6,..	*21*,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
E 1	*12*,16,..,..,4,18	*38*,*1*,..,..,18,44	..,*22*,..,*9*,..,..	..,..,*27*,..,*10*,..	..,..,..,*25*,..,..	..,..,..,..,..,..
2	..,*3*,..,..,8,19	..,..,0,*2*,5,..	..,..,*17*,12,..,69	..,..,..,*4*,0,..	..,*12*,..,..,*49*,..	..,..,..,..,..,..
8	*16*,2,..,..,5,..	20,..,0,..,*31*,..	..,*42*,..,15,..,13	*30*,*55*,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
9	*59*,*5*,*16*,..,*7*,*16*	..,9,..,*20*,14,*8*	*25*,*31*,..,0,*15*,11	..,..,..,..,..,..	..,..,..,..,..,..	..,..,*78*,..,..,..
F 1	..,..,6,2,20,16	..,*26*,*16*,*5*,33,24	*35*,*36*,11,*8*,4,32	..,*82*,*32*,*26*,*24*,..	13,*22*,..,..,..,..	..,..,..,..,..,..
P A 1	..,..,..,*2*,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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B 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
3	..,28,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
C 3	*2*,..,..,*17*,..,*8*	..,12,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
5	..,15,..,1,*10*,..	7,..,..,..,..,9	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
11	..,..,..,..,*17*,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
D 3	9,12,0,0,20,25	18,28,17,..,24,5	*2*,*14*,..,..,26,..	..,0,*1*,..,*6*,..	..,*3*,..,..,14,..	..,..,..,..,..,..
5	..,9,..,6,*2*,..	12,7,..,*9*,10,..	..,*20*,..,*8*,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
9	5,8,*7*,..,*24*,*12*	16,*7*,13,*4*,62,..	*49*,25,..,..,..,..	..,..,..,..,*56*,..	..,..,..,..,..,..	..,..,..,..,..,..
E 5	1,19,..,37,38,..	*6*,*49*,26,*1*,26 ..,	*30*,3,..,*10*,58,*4*	0,*92*,..,*50*,28,..	*60*,..,10,..,*85*,..	..,..,..,..,..,..
F 3	..,*16*,1,22,9,..	..,*28*,*22*,2,..,..	..,*52*,..,..,..,28	..,*79*,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
M B 2	..,..,..,*9*,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
8	..,36,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
9	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
C 4	*3*,29,..,6,11,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
10	..,8,8,..,4,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
D 4	22,0,..,*2*,9,*8*	0,18,..,42,*32*,0	..,..,..,..,..,5	14,..,..,..,..,..	19,..,..,..,32,..	..,..,..,..,..,..
10	5,*28*,17,..,*3*,..	9,..,..,*21*,5,7	..,14,..,..,*32*,*28*	..,..,..,*48*,..,..	..,..,..,..,..,..	..,..,..,..,..,..
E 3	3,*15*,0,..,2,0	5,10,3,..,12,..	15,*31*,..,..,17,12	*24*,*28*,*11*,*17*,*11*,*60*	*35*,*26*,*39*,..,*64*,..	..,..,*76*,..,..,..
4	14,12,22,18,36,13	8,5,16,49,25,16	17,26,21,*6*,27,..	*30*,*24*,*20*,*10*,*17*,..	*26*,*18*,..,..,*4*,..	*31*,..,..,..,..,..
6	*4*,5,..,..,15,19	*8*,..,4,14,26,15	*17*,0,*26*,16,16,..	*11*,19,*71*,77,50,..	*24*,*42*,..,..,..,..	..,..,..,..,..,..
7	9,1,0,0,7,8	10,..,..,..,..,9	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
F 2	*2*,1,0,10,41,33	*9*,16,3,14,22,62	*2*,*3*,..,1,31,38	*49*,*24*,*22*,..,*16*,..	..,..,..,..,..,..	..,..,..,..,..,..

Region.	Oxford. Magn. B.	Oxford. Magn. 4.5.	Oxford. Magn. 5.0.	Oxford. Magn. 5.5.	Oxford. Magn. 6.0.	Oxford. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	*20*,*10*, *9*,*11*, *6*,*12*	..,31,..,28,10,..	..,18, *4*, 7,*10*, 2	.., *9*, *3*, *9*, 1,*10*	.., *7*,10, 0, *2*,*17*	..,*20*,*16*, *1*,*11*,*16*
B 4	.., 0, 8, *6*,..,*12*	..,14, *5*,.., 0,..	..,12,13,14, *8*,..	*20*, *8*,14,12, *5*, 0	.., *2*, *8*, 7, 0,*12*	.., *9*,..,*10*,..,..
5	..,*10*,..,.., *3*,..	..,.., 5,21,..,..	.., 7, 8,.., 7,..	..,*10*,10, 9,14,26	.., *3*, *4*,*22*, *5*, *4*	..,*10*,*18*, 6, 5,..
6	*2*,..,10, *4*,*13*,..	.., 7, 0,..,..,..	.., 8, 8, *4*,15, 8	21,11,*13*,.., *2*,10	.., 7,10, 0,13,17	..,*25*, *4*,*28*,*14*,..
7	2, *4*,..,*21*, *2*, *2*	..,*18*,10,.., 6,..	.., *1*,*21*, 4, 3, 0	14, *2*, *8*,12, 8,19	.., 3,..,19, *1*,*14*	*2*, *7*,.., 5,17,15
C 6	*3*, *5*,*26*, *4*,..,11	..,19,32,*15*,..,29	..,14, 5,*15*, *2*,16	.., 3,14,18, 9,14	14, 1,15,10,11,31	..,18,..,..,..,..
7	..,..,.., *6*, 6,*19*	.., *5*,.., 0, *1*,*37*	..,18,*10*, *7*, 5, 9	..,14, *4*,12,34,*10*	10, 7,10,12, 7, 9	..,*16*,..,.., 7,..
8	.., *2*,13, *3*, *2*,..	..,10,..,26, 4,*20*	..,12, 8, *3*, *6*,*20*	..,10, *5*,11, 0,*12*	.., 7,10, *2*,10,12	.., *8*,.., 6,..,..
9	43, 5, *7*,.., *4*,..	*13*,24,..,..,*12*,22	2,20,12,..,*18*,11	20,11,32,16,13,37	..,15,16, 3,20, 9	..,*12*,..,..,14,..
D 6	..,..,..,..,..,..	..,..,*27*,..,*15*,..	7, *9*,..,.., 2, 9	.., 7,..,..,28,..	.., *2*,..,..,16,..	..,..,..,..,..,..
7	*25*,*13*,..,..,..,..	.., 5,..,..,..,..	..,..,..,..,*11*,24	..,26,..,18, 9,..	.., *6*,38, *4*,11,..	..,*34*, *9*,..,..,..
8	..,*33*,..,*16*,..,..	..,10,..,..,*22*,..	..,15,..,..,*17*,..	23,32,..,..,28,..	.., *1*,..,..,15,..	..,..,..,..,..,..
S C 1	*40*,*10*, 3, *8*, *1*,..	..,*20*,..,..,*18*,*23*	..,.., 0,.., 5, *7*	4, *3*, 8, 0, *6*,*12*	14, 1, 6,.., *9*,..	.., 6,.., *6*,*26*, *2*
2	5, *2*, 1,..,*17*,*38*	11,32,*11*,.., 6,..	16,12,10,.., 5,..	14,13,12,14, 6,..	.., *1*,12,18, *3*,*25*	..,..,13, *2*,*83*,..
12	*32*,*20*,..,10,*13*,*11*	2,..,22, *6*, 4,..	18,19,..,.., 7, 8	*36*, *8*,*16*,.., 5, *6*	..,10, *5*,*13*, 4,..	..,..,*10*, 4,*20*,..
D 1	..,..,..,..,*25*,*61*	..,..,..,..,14,*36*	..,.., 0,..,30,..	..,..,12,..,33,17	.., 7,32,21,20,..	..,19,..,..,27,..
2	19,..,..,..,*27*,..	*42*,..,..,..,..,..	31, 6, 4,*50*,..,..	*12*, 2,24,18,13,22	..,33, *6*,19, *1*,..	..,..,..,.., 3,..
11	..,*11*,.., 1,..,..	*6*,..,..,..,12,24	..,37, 0,.., 6,..	24,20,..,..,14,..	.., 7,25,15, 6,..	..,*25*, 1,24,..,..
12	*1*, 0,..,*15*,.., *2*	..,*28*,..,.., 7,*10*	15,..,23,..,..,38	14, 0, 6,..,15,..	.., 7,.., 8,21,..	..,15,10,..,*12*,..
E 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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8	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
9	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
F 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
P A 1	8,34,.., *7*,..,..	8, *3*,*14*,..,14, 4	*10*,10,24, *1*, 6, 0	13, 7, 8,16, 4,10	.., *6*, *4*,27, 2,*11*	..,*26*,*10*,..,*22*,10
3	6, *2*, *3*,24,*10*,..	.., 9,32,.., 2,..	14,21,12, 1, 6,16	17, 6,10,.., 0,11	.., *6*, *4*, 8, *1*, *4*	..,*12*,..,..,*20*,..
B 1	6,16, 6, *5*,*13*,*11*	6, *6*,16,..,..,..	20,17, 4,12,10,12	12,15,18, 1, 6, 7	.., 1, 2, 3, 4,*27*	..,18,..,..,..,..
3	.., 5,27,.., 6,..	..,37,..,..,28, 9	20, 9,12,34, 5,14	7,15,25,19,10,..	.., 1,47, *6*, 3,*19*	.., *6*,*15*,*24*, *5*,..
C 3	11,37, 3, 0, 4, 6	*2*,26,24,44, 9,*13*	11, *1*,13,19,19,21	23,13,12,14, 3,..	14, 4,*12*, *4*, 5,..	..,*10*,*16*,..,..,..
5	..,12,..,11, 0,..	10,20, 9,.., 8, *6*	3,28,10, *6*, 1,28	.., 9, 6,15, 9,24	..,15, 4,19, 9, 6	..,28,10, 5,..,..
11	*16*,..,*22*,*19*,*12*,..	.., 8,..,*10*, *4*,..	22, 4,*37*,*10*, *6*,*24*	.., *4*,16, 0, 6,*22*	*7*, 3,*18*,*10*, 2,*15*	..,..,*13*, *6*, *1*,*12*
D 3	7, *7*,.., *4*, *3*,..	35,..,*18*,..,21,..	10,22, *4*,11,10, 5	*3*, 0,36,..,46,*21*	10, 1,10, 5, 0, *1*	*10*,..,.., 6, 8,..
5	..,*32*,..,..,16,..	..,31,..,40,..,..	.., 0,..,21, 4,..	..,*14*, *5*,20, 2,24	..,11,..,.., 6,..	..,..,..,..,..,..
9	*23*,*21*,*30*,.., *4*,*24*	6, *6*, *2*,..,..,..	..,..,..,..,16,..	..,38,..,13,30,..	..,20, 2,..,..,..	..,..,..,..,..,..
E 5	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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M B 2	22,..,.., 4, 3,..	28,19,50, 2,18,23	9,16, 9,18,10,..	9, 5,14,..,20,..	10, 2,10,.., 6,..	..,*36*,..,..,*64*,..
8	.., *1*,*17*, 8, 7,12	19,15,25,18,19,24	9, 1,22,22,18,..	12,16,15, 5, 3,16	*2*, 0, 7, *1*,11, 4	5,*25*,*26*,.., *6*, *6*
9	11,30,53,.., *6*,..	24,20,30,*32*, 4,..	14,11,10, *5*, 8, 3	12,14, 9, 8, *1*,15	13, 5,10,..,*11*,..	.., *8*,15,..,*17*,..
C 4	14,14, *3*, *1*, 8,20	0,28,16,..,10,..	32, *1*,..,12, 4, *4*	6, 2, 5, *9*, *4*,12	*12*, *5*,*26*,14,14,26	.., *6*, 0,..,..,..
10	.., 3, 4,.., *1*, 3	8,18,49, *8*,25, *5*	11, 5,46, 2,11,..	*6*, 6,14, *9*,10, 5	10, 7, 6,14, 1,..	..,*24*,11,.., 7,..
D 4	..,50,..,..,30,..	..,..,..,..,..,..	*4*,..,..,*22*, *1*,*18*	*14*,*16*, 1,..,23, 8	.., *4*,33,*19*,14,..	..,..,..,*27*,..,..
10	..,*28*,..,.., 4,..	24,..,22, 6,..,..	*3*,..,..,11,24, 1	5,18, 8,..,16,..	.., *1*,.., 2,..,16	..,..,..,.., 6,..
E 3	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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F 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..

Region.	Potsdam. Magn. B.	Potsdam. Magn. 4.5.	Potsdam. Magn. 5.0.	Potsdam. Magn. 5.5.	Potsdam. Magn. 6.0.	Potsdam. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	22,20,11, *4*, 9,*10*	..,18,..,14, *8*,..	..,29,20,14, *3*, *5*	..,28,17, 5, *2*, *6*	..,34,26, 4, *1*,*17*	..,24,25,14, 6, *8*
B 4	..,17,20,13,.., 8	..,15,24,.., *1*,..	..,13,18,10, *1*,..	30,28,13,20, *3*, *2*	..,36,31,11, 2,*10*	..,40,30,15, 4,*11*
5	..,22,..,.., 1,..	..,..,32,14,..,..	..,24,20,.., 2,..	..,24,20,12, *1*,*16*	..,26,23,21, 8, *2*	..,28,25,16, 7, 0
6	31,..,25,32, 4,..	..,27,20,..,11,..	..,28,17,17,15, 2	28,34,20,.., 5, *6*	..,42,29,13, 0, 4	..,35,31,26, 7, *5*
7	25,24,..,10, 3, 5	..,20,24,..,23,..	..,22,20,11,11, 0	22,29, *2*,16, 4, 9	..,39,30, 8, 6, 0	38,32, 2,19, 8,*24*
C 6	26,28, 8,12,.., 0	..,23,22,20,.., *6*	..,26,22,12, 4,*20*	..,28,26, 6, 7,*11*	37,34,13,22, 4,*16*	..,35,37,18, 0,..
7	..,..,..,28,11, *2*	..,16,..,18, *7*,*21*	..,24,15, 8, 3, *7*	..,32,24,16, *2*, *3*	23,33,23,27, *2*,*16*	..,27,25,11, 3,*10*
8	..,17,18,21, 7,..	..,33,..,20, 5, 0	..,31,28,14, 5, 4	..,35,24, *4*,11,*12*	..,40,25,22,17,*11*	..,22,28, 9, 2, *2*
9	26,26,29,.., 9,..	27,16,..,.., *2*,14	34,30,21,.., 5, *3*	29,31,23,27, *2*, *2*	..,32,25,16, 4, 1	..,29,33, 8, 1, *8*
D 6	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
7	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
8	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
S C 1	41,27,30, 6,35,..	..,34,..,.., 5,10	..,..,15,.., 1, 6	27,18,19,26, *6*, *1*	27,30,23,30, *1*, *4*	..,40,11,12, *4*,*13*
2	*12*,24,..,.., 1, 7	24,14, 5,.., 7,..	29,26, 4,..,16,..	34,27,18,14, *2*,..	29,32,30,11, 4, 2	25,34,18,10, 3,*20*
12	13,50,..,13,16,..	2,.., 8, 7, *1*,..	18,20,..,.., 5, 3	29,23,28,.., *8*,*15*	..,36,22,24, 0,*16*	..,25,31,16, 7,10
D 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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P A 1	17, 6,..,19,..,..	21,17,19,..,*10*,*23*	24,32, *4*, 6, 0, *4*	33,22,12, 6, *1*,*22*	..,27,13, *3*, *7*,*26*	..,29,13,*15*, *6*,*22*
3	20,30,18, 6, 0,..	..,18, 2,.., 4,..	16,20,13,24, *4*,*11*	12,24,13,.., *7*,*10*	16,28,19, 4, 2,*20*	35,28,24,10, *2*,*16*
B 1	22,15,19,11, 2, 8	19,21, 6,..,..,..	20,18,24,10, 0, 6	33,30, 4, 8, *1*, *4*	36,28,12, *5*, *7*,*13*	36,30,18,14, *8*,*10*
3	..,17,22,.., 2,..	..,29,..,.., 2,*25*	4,26,19, 0, *9*,*16*	17,26,14,16, 2, *7*	..,36,28,15, *1*, 4	..,32,20,10, 1,*12*
C 3	24,24, 6,16,12, 9	22,25,23, 3, *5*,*19*	23,25,27,16, 1,*39*	32,26,22, 5, 2,*13*	44,31,22,16, 2, *3*	42,34,28, 3, *2*, *4*
5	..,31,..,10, *3*,..	25,20,29,.., 5, 3	37,40,17,10, 9,*13*	..,25,22, 8, 0,*14*	..,34,27,12, 0, *2*	..,29,27,10, 2, *9*
11	34,.., *6*,30, 9,..	.., 3,.., 2, *8*,..	22,28,*10*, 6, *4*,*14*	..,25,18,*10*, *3*,*34*	30,32,18,13, *2*,*24*	..,40,30,14, 7,*18*
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8	..,16, 8,20, 2,*12*	26,22,44, 0, 8,*15*	23,20,21,12, 1,..	31,30,30, 4, 2,*19*	35,37,20, 8, 3, *7*	34,33,21,12, 6, *3*
9	37, 9,13,.., 1,..	15, 8, 4, 8, *7*,..	19,22,14, 7, *7*, *3*	24,23,14, 7, 0,*15*	28,31,20, 5, *1*,..	36,26,13, 5, *3*,*18*
C 4	24,26,18,24,12, *8*	24,23, 8,.., *1*,..	27,32,..,18, *1*, 8	47,33,15,10, 2, *8*	31,39,32,13, *1*, *2*	35,38,27,14, 3,*16*
10	..,27,26,.., 9,10	33,15,25,16, 8,*20*	23,25,16, 7, 6,..	11,24 19,11, *1*,*10*	33,31,19, 9, 6,..	39,38,28,19, 1,*12*
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Region.	Williams. Magn. B.	Williams. Magn. 4.5.	Williams. Magn. 5.0.	Williams. Magn. 5.5.	Williams. Magn. 6.0.	Williams. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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E 1	2, 0,..,.., 2, 5	*19*, *8*,..,.., 0,29	..,*37*,..,*26*,14, *1*	..,..,*35*,*30*,11,*11*	..,*58*,*14*,*61*,*24*,*42*	..,*82*,*24*,..,*48*,*37*
2	.., *6*,..,.., *3*,*41*	..,..,*17*,..,*10*,..	*32*,*32*,*25*,*14*, 6, 8	..,..,*45*,*26*, 1,..	*7*,*30*,*40*,..,*21*,*50*	..,*60*,*26*,*22*,*44*,*56*
8	*2*,48,..,..,15,..	26,..,*18*,..,24,..	.., 8,*19*, *8*,11,16	9, 1,*35*,*35*, 0,..	..,*15*,..,..,..,..	..,*82*,*70*,..,..,..
9	*41*, *3*,..,..,*18*, 6	..,*16*,..,*15*, *7*,*36*	*34*,*32*,..,*31*,*12*,..	*47*,*30*,24,.., *8*, *1*	..,*53*,*39*,..,*14*,..	..,*20*,*34*,*45*,*23*,..
F 1	..,.., *6*,19, *2*, 3	..,*31*, *2*,*39*, 7, 6	*6*,*21*,.., *8*, 1,20	*24*,*39*,*14*,*43*,*13*, 1	..,*40*,*72*,..,*24*,..	*65*,*60*,*64*,*65*,*48*,..
P A 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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E 5	*23*,*10*,..,18,*15*,..	3,*40*, 1,..,10,..	1,*12*, 2,15,31,32	*12*,*20*, *3*,29,27, 8	*18*,*30*,14,*28*,10,..	*27*,*60*,*50*,..,*56*,*36*
F 3	..,35,*30*,*18*, 6,..	3,*86*,11,20,16,..	*11*,*26*,.., *3*, 5, 3	*42*,*30*, *5*, *3*, *8*,*76*	..,*23*,*26*, 0, 3,*19*	..,*62*,*51*,*71*, *7*,*44*
M B 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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E 3	4, *4*, 5,.., *1*,*13*	3, 1,23,.., 2,..	*4*, *9*,22, 3,10,23	*7*, *9*, *5*,*17*,19,59	*24*,*24*, 1, *5*,40,24	*47*,*53*,*66*,..,*34*,..
4	*9*,*15*, *7*,*10*, 5,12	15,*27*, 1, *6*,23, 3	4,*14*,*28*,26,17,51	*18*, *3*,*34*,12, *1*,..	*32*,*33*,*36*,*29*,*20*,..	..,*60*,*48*,*54*,*26*,*68*
6	*7*, 8,..,.., 9,16	18,32,31, 4,33,39	11,16,21,20,50, *4*	*22*, 4, 6, *6*,20,..	*26*,*16*,..,*37*,*11*,..	*69*,*84*,*44*,..,..,..
7	4,30,11, 1,15, *5*	26,32,..,..,54, 5	11,20,..,26,24,41	*12*, *5*,21,*13*, *6*,..	*33*,*32*,*61*,..,*10*,..	*67*,*66*,*57*,..,..,..
F 2	*12*, *7*,14,*18*,20, 4	3, 2, *4*,30,40,39	*31*, 1,.., 9,19,22	*24*, 7,14,12,*11*,90	*38*,*43*,*50*,*10*, 9, 7	*62*,*43*,*61*,*46*,41,..

Region.	H. A. 46,2. Magn. B.	H. A. 46,2. Magn. 4.5.	H. A. 46,2. Magn. 5.0.	H. A. 46,2. Magn. 5.5.	H. A. 46,2. Magn. 6.0.	H. A. 46,2. Magn. 6.5.
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N A 2	.., 7, *2*, 5, *5*,*11*	..,..,..,12,..,..	..,18,10,..,*12*,*14*	..,16,11, 1, *4*,*13*	..,17, 5,..,*15*,..	..,13, 5,.., *2*,..
B 4	..,.., 8,..,..,..	..,..,..,..,..,..	..,.., 6,..,..,..	7,10,..,..,..,..	..,10,13,..,..,..	..,24,..,..,..,..
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7	28,..,.., 8, *8*,..	..,22,..,..,..,..	..,12,.., *7*,..,..	24,20,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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11	..,10,..,..,..,..	..,..,..,..,..,..	.., 3,..,..,..,..	..,31,..,..,..,..	.., 8,10,*14*,..,..	..,..,..,..,..,..
12	..,16,..,..,..,..	..,..,..,..,..,..	20,15,..,..,..,..	.., 8,..,..,..,..	..,.., 0,..,..,..	..,..,..,..,..,..
E 1	..,..,..,..,..,..	..,..,..,..,..,..	.., 0,.., 3,..,..	.., 0,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
2	.., 2,..,..,..,..	..,..,..,..,..,..	10,..,..,..,..,..	..,..,..,..,..,..	.., *8*,..,..,*10*,..	.., *7*,..,..,..,..
8	..,..,..,..,..,..	..,..,..,..,..,..	.., *3*,..,.., *5*,..	3,..,..,..,.., *8*	..,..,..,..,..,..	..,..,..,..,..,..
9	..,..,..,..,..,..	.., *4*,..,..,..,..	.., 1,..,.., *1*,..	..,..,..,.., 6,..	..,..,..,..,..,..	..,..,..,..,..,..
F 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
P A 1	7,..,..,..,..,..	5, 6, 8,..,..,*34*	21,11,..,..,..,..	12, 6, *1*,..,*12*,*24*	..,10, 3,..,*14*,*33*	..,10,..,.., 0,..
3	16,18, 5, *2*,*10*,..	..,17,11,.., *4*,..	20,11, *3*, 9, *6*,*17*	13,14, *5*,..,*17*,*18*	..,12,.., *8*,*12*,..	..,..,..,..,..,*26*
B 1	..,.., 2, 4,.., 3	..,..,..,..,..,..	.., *9*,..,..,..,..	31,14,..,..,..,..	..,12,..,..,..,..	.., 2,..,..,..,..
3	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,.., *4*,..	..,14,..,..,..,..	..,..,..,..,..,..
C 3	..,..,..,..,..,..	..,..,..,..,..,..	23,.., 6,..,..,..	6, 9,.., *4*,..,..	.., 7,..,..,..,..	..,..,..,..,..,..
5	..,..,..,..,..,..	..,..,..,..,..,..	..,18,..,..,..,..	.., 6,..,..,..,..	..,13,..,..,..,..	..,..,..,..,..,..
11	..,..,..,..,..,..	.., 8,..,..,..,..	23, 9,..,..,..,..	..,27,..,14,..,..	..,13,..,..,..,..	..,..,..,..,..,..
D 3	.., 9,..,..,..,..	5,..,..,.., *1*,..	.., 8,..,..,..,..	15,..,..,..,..,..	.., 9,..,..,..,..	..,..,..,..,..,..
5	..,..,..,..,..,..	..,..,..,..,..,..	24,..,..,..,..,..	.., 4,..,..,..,..	..,15,..,..,..,..	..,..,..,..,..,..
9	..,..,..,..,..,..	..,10,..,.., *6*,..	..,..,..,..,..,..	.., 2,..,..,..,..	.., 5,..,..,..,..	..,..,..,..,..,..
E 5	..,..,..,..,..,..	..,..,..,..,..,..	*13*,..,.., *6*,..,..	.., 8,..,..,..,..	.., 1,..,..,..,..	..,..,..,..,..,..
F 3	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
M B 2	..,..,.., *9*,..,..	..,..,..,..,..,..	9,..,..,..,..,..	..,22,..,..,..,..	5,15,..,..,*16*,..	.., 6,..,..,..,..
8	..,..,..,..,..,..	11,..,..,..,..,..	22,10,18,..,..,..	..,20,..,..,..,..	..,18,..,..,..,..	..,..,..,..,..,..
9	..,..,..,..,..,..	6, 1, 8,..,..,..	18,..,..,..,..,..	..,18,..,..,..,..	19,14,..,..,..,..	..,..,..,..,..,..
C 4	..,..,..,..,..,..	..,..,..,..,..,..	..,12,..,..,..,..	..,..,..,.., *8*,..	..,15,..,..,*18*,..	..,..,..,..,..,..
10	..,..,..,.., 8,..	..,..,..,..,..,..	15,16,..,..,..,..	..,17,..,..,..,..	27,..,..,..,..,..	..,..,..,..,..,..
D 4	..,..,..,..,..,..	17,..,..,..,..,..	28,..,..,..,..,..	..,12,..,..,..,..	..,23,..,..,..,..	..,..,..,..,..,..
10	..,..,..,..,..,..	25,..,..,..,..,..	..,..,.., *3*,..,..	33, 3,..,..,..,..	..,10,..,..,..,..	..,..,..,..,..,..
E 3	..,..,..,..,..,..	..,..,..,..,..,..	16,..,..,..,..,..	9, 3,..,..,..,..	17,..,..,..,..,..	..,..,..,..,..,..
4	..,..,..,..,..,..	..,..,.., 0,..,..	6,..,..,..,31,..	.., *6*,.., 5,..,..	..,..,..,..,..,..	..,..,..,..,..,..
6	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	3, *3*,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
7	*6*,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	4, *5*, 9, *2*,*24*,..	..,20,..,..,..,..	..,..,..,..,..,..
F 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..

Region.	Bailey. Magn. B.	Bailey. Magn. 4.5.	Bailey. Magn. 5.0.	Bailey. Magn. 5.5.	Bailey. Magn. 6.0.	Bailey. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	0, *2*, *5*,68, *3*,*26*	..,32,.., 6,14,..	..,18, 6,20, *6*, 6	.., 5, 3, 1, *2*, *7*	.., 3, *6*, *9*, *4*, *6*	.., 2, *4*, 4, *5*,*11*
B 4	..,16,12, 8,.., 0	..,*11*,16,.., 1,..	.., *7*,18, 4, *4*,..	.., 5, 6, *8*, *3*, *6*	.., 4, *1*, *3*, 1, *4*	.., 4,.., *3*,..,..
5	..,12,..,..,*11*,..	..,.., 6, *2*,..,..	.., 5,19,.., 5,..	.., 3, 3,19, *1*, 3	.., *5*, *2*, *2*, *5*,10	.., *4*, *7*, 6, *8*, *5*
6	25,..,24,14,*14*,..	..,12,*14*,..,..,..	..,14,14, 4, *8*,*10*	*11*, 5,*11*,.., 1, *9*	.., 3, 2, 0, *3*,*27*	..,*14*, *2*, 6, *6*,..
7	8,12,.., 7, *7*, 2	.., 2,19,.., 4,..	.., 7,..,10, *6*, *2*	*2*, 7, 0, 5, *6*, 1	.., 3,.., 3, 0, 3	22, 2,.., *7*, *6*,*35*
C 6	*1*,10,.., 6,.., *2*	..,*10*, *1*,21,.., 9	.., 3, *4*, 2, *4*, 3	.., 7, *3*, 3, *8*, 5	..,*10*, 0,*15*, *4*, 8	.., *6*,.., *7*,14,..
7	..,..,.., 0, *2*, 2	..,11,.., 4, *3*, *8*	.., 7, *6*, 5, 0, *5*	.., 1, 6, 8, 1,12	*17*, *1*, 6, *6*, *6*, 4	.., 2,10, 7,*18*,..
8	..,11,16, 9, 4,..	..,31,.., 6,*12*, *6*	.., 3, *2*, *2*, *3*, 1	.., 6, 0,*29*,13,*27*	.., *5*, *1*,19, 3, *3*	..,14,*33*, *9*, 0,..
9	28, 8, 3,.., 4,..	11, 2,..,..,*10*, 5	22,21,20,..,*10*,17	8, 5,24, *6*, 3, *2*	.., *3*, 4, 9, 5,14	..,*16*,18,*39*,*29*,*77*
D 6	.., 8,..,.., 0, 2	..,*10*, 8,..,18,..	5, *2*,.., *4*, *5*, 4	*8*, 1, 6, 1, 6,21	.., 7,*11*, *9*, 6, *1*	.., *9*, *2*, 7, 2, 4
7	*2*, 5,14,.., *4*,..	..,*47*, 8,..,..,..	8,.., 1,.., 2,10	8,10,11, 7, 6,..	.., *6*, 3, 4, 3, *4*	.., *2*,*12*, 0, 8,..
8	4, 4,.., *6*, *4*,*29*	10,12, 1,.., 4,..	*1*, 6,20,23, *2*,20	0,10,23,12,17,26	.., 4, 2,.., 3,29	..,*20*,..,.., 6,..
S C 1	25,27,23, 2, *2*,..	..,38,..,.., 3, 5	..,..,10,.., 7,36	*6*, 1, 8, 8, 2,11	*4*, 3, *3*, *4*, *8*,..	..,*20*,*16*, *2*,*20*,*20*
2	7, 2,..,..,*10*,*20*	2, 6, 6,.., *3*,..	12, 7, 9,.., *2*,..	14, 0, 3, 0, *7*,..	.., *5*, 2, 5, *8*, *7*	..,*17*, 5,*11*,*62*,..
12	*21*, 6,.., 3, 5, *6*	9,.., 4, 4, 7,..	2, 8,..,.., 0,12	*15*, 6,16,.., 0, 5	.., 5,*13*, *9*, 1,*10*	.., 0, *4*,.., *6*,11
D 1	..,..,..,..,*17*,*18*	*39*,..,..,..,10, *3*	..,*15*, *6*,.., 6, 7	.., *6*, *3*,.., 2, 1	.., 0, 8, 7, 3, *9*	.., 5,.., 1,14,18
2	14, *2*,..,*58*,*14*,*31*	*2*,*25*,.., 3,.., *4*	1, *5*,*11*, *8*, 0,..	*13*,*12*, 0,10, 9, 4	.., *5*, *3*, 2,*15*,*14*	.., *1*, 8,12, *1*, 4
11	..,10, 2,*13*, *5*, *2*	1,..,.., 1,14, 9	2, *1*,10,.., 0,..	2,15, *3*,31, 0, 0	7, *2*, 4, *3*, 3, *2*	.., 4, 0,*20*, *4*,..
12	9, 0,.., 1,*16*, 4	2, 7,..,..,11, *4*	*17*, *5*,*15*, *8*, *4*, *6*	3, 7, *1*,.., 8,..	.., 1,80, *8*, *4*, 2	..,*13*,*26*, *4*, *9*, 4
E 1	*13*, 8,..,.., *2*, 8	*10*, 8,..,.., 0,*33*	..,*12*,.., *6*, 6, *6*	.., 1,*10*, *7*, *1*, *1*	.., *8*,*24*, *3*,*10*, *6*	.., 1, *4*,..,.., *7*
2	..,*23*,..,.., *7*, 2	..,..,*12*, 4, *7*,..	*16*, *4*, 4, *1*,24, 0	..,.., 0, 2, *8*,..	.., 0, *8*,*12*,*11*,..	..,*17*, 5,..,..,23
8	*3*,14,..,.., *1*,..	16,.., *5*,.., *6*,..	.., *8*, 2, *2*,10, 2	7, 5, 5, *6*, 3, 5	5, *2*, *7*,*14*, *3*, 6	*1*, *1*, 8, *3*,*21*,..
9	*31*,*10*, 0,.., *4*, *8*	..,10, *6*,13, 5, 6	*9*, 2,.., *4*, 0, *9*	1, 6, *6*, *2*, *1*, *6*	7, *5*,*11*,*19*, *4*, *6*	*34*, *8*,*10*, 1, 2, 1
F 1	..,..,*10*,*13*, 6,27	..,*24*,*12*,*28*, 1, 6	*17*,11,*34*,*17*, 2, *2*	*14*,*13*,*10*,*18*, 3,11	.., *3*,*10*, *8*, *3*, *9*	*18*,*14*,..,*10*,..,*11*
P A 1	7,19,.., *8*,..,..	*2*, *5*,*39*,..,*17*,11	*1*, *1*,*16*, 0,*16*, *2*	*6*, *1*,10,*22*, *1*, *3*	.., *5*, *4*,14, *4*, 0	.., *6*, *5*,.., *7*,*28*
3	12, *6*,19, *6*, *5*,..	.., *4*, 0,.., *3*,..	1, 1,12, *2*, *2*,*18*	*3*, *7*, 5,.., *4*, *3*	6, 4, *3*,*12*, 1, 1	..,*18*,..,..,*18*,*13*
B 1	*4*, *3*,16, *3*,*14*, *5*	2,*10*, *8*,..,..,..	*11*, 3, 5, *4*, *5*,15	1, *5*, 4, *5*, *5*, 5	.., *3*, 7, 0,*16*,..	3, *5*,..,.., *9*,..
3	.., 9, 2,..,10,..	.., 4,..,.., *4*,26	12, 9,*19*, 9, *3*, 6	*13*, 6,15, *1*, *1*,*29*	..,*12*, *9*,*10*, 1,*40*	..,.., *5*,..,..,..
C 3	6,18, *2*, *3*, 1, *5*	0,13, 2, *2*, 3,*23*	10, 0, 3,14, 2,21	8, 2, 0, 2, *6*, 3	*9*, *4*, 2,*14*, *3*,..	..,*11*,*17*,.., *4*,..
5	..,24,.., *1*, 6,..	*12*, *2*, 3,..,14,*22*	*34*,11, *1*, 1, 6, *7*	.., 2, 4, 4, 8,19	.., *9*,*10*, *3*, 4, *1*	.., 4, 2, *4*, 1,..
11	0,..,*44*,*12*, *4*,..	..,16,.., 0, 7,..	5,10,..,*18*, 6,14	.., 1, 7, 6, *2*,*18*	4, *1*, *1*, 3, 2, 3	..,..,*10*,*34*, *8*, 0
D 3	4, 6, 6, *7*, *4*, 3	3,13,*17*,.., *2*, *6*	*4*, *4*, 9, 7, *1*,*37*	*5*, 0,*11*, 7, 3, 3	8, 1, 8,*14*,*14*, 4	12,32, 6, *7*,*18*,..
5	.., 0,..,*18*, *3*,..	*2*,38,..,10, 9,..	*8*, 6,*23*, *4*, 0, 5	5, *1*,*12*, 6, *2*, *6*	2, *8*, 1, 7, *4*,..	..,*26*, 1, *8*,*14*,..
9	7,*13*,21,.., 4,*22*	2,10, 5, 1,12,..	10, 2,16, *6*, 5,..	17, 7, 7,14, 8, 0	*1*, *4*,*27*,*10*, *1*,..	..,*10*, *4*,.., *6*,..
E 5	*4*, *3*,..,14, *7*,..	2, 7, 6, 9, 5,..	*2*, 6,12, 4, 6, 0	2, *3*, *2*, *5*, 1, 0	*13*, 4,*11*,*14*, 8, *6*	..,24,.., *6*,..,..
F 3	..,22, *8*,*15*, *3*,..	*18*,*21*,15, *8*,12,..	*23*, *1*,..,12, 9, 5	*30*,*10*, *6*, *9*, 3, *4*	*18*, *8*, *4*, *2*, *2*,..	*7*,*18*,*32*,*41*, *8*,..
M B 2	9,..,.., 4, *9*,..	8,14, 8, *6*,*15*, 3	1, 2, *4*,10, *1*,..	2, 3, 8,*16*, 0,..	*2*, *1*, *7*, *8*, *9*,12	..,*24*,..,*11*,*30*,..
8	..,10, *7*, *4*, *6*, 3	6, 8,..,18,*16*,10	7, 7,10, 3, *4*,..	3, 7, 2, 4,*11*,*16*	*7*, *4*, *1*, *8*, *6*,*16*	1, *9*, 4, 6, 0,..
9	37, *5*,12,.., *3*,..	11, *3*, 8, 2, *4*,..	9,12, *8*,*25*,*10*, *9*	4, 3, 3, 4, *7*, *9*	*4*, *2*, 4,.., *6*,..	.., *3*,*19*,.., *9*,..
C 4	18,14, *1*, 5, 2, *3*	*4*, *5*,*10*,.., 2,..	*2*, 0,.., *3*, 0, 6	*49*, *1*, *5*, *1*, 5, *6*	*14*, *2*, 6, 6, *5*, 0	30,*22*, *9*,*39*,..,*32*
10	..,15,*10*,.., *3*,*20*	22,18,16,*10*, 0,..	2, 4, 4, 3, 2,..	8, 4, 3, *8*, 6,*30*	7, *3*, 4, *4*,*13*,..	.., *4*, 7, 5,*10*,..
D 4	7,10,..,*12*, 0, *8*	3,*10*,.., 1,*13*,*22*	*6*, *4*,..,*17*, *2*, *8*	*9*, *4*,*16*, *2*, 6, 3	*7*,*10*, *8*, *6*, *8*,*62*	*20*,*32*,*12*,*15*,..,..
10	8,15, 2,.., *6*,..	18,30, 5,*22*,14, 0	4, 6, 9,12, 7, *2*	5, 8,12, 2, 5, *2*	7, 5,10, *1*, *4*,10	.., *8*,.., 8,*16*, *5*
E 3	*1*, 1,*14*,.., 8,*26*	6,11,18,..,10,..	8, 0, 6, 9, 4, 8	8,11, 1, *4*, *7*, 2	13, *5*, 3, 2, *7*,22	*7*,*28*,..,*17*,..,..
4	*1*, *3*,*10*, *6*, *1*, *8*	*2*, *9*,14, *2*, *7*, *6*	5, 0, *6*, 2, 5, 1	1, 1, 3, *4*, 7,*10*	*23*, 1, 9, 5, 8,..	*18*,*25*,..,..,..,..
6	*7*, 4,..,.., 1,*19*	*2*, 0,*21*, *8*, *1*,*31*	3, 4, *4*, 2, 0, *9*	*8*, 3, 6, 1, *4*,*12*	*11*, *9*,*20*, *9*, 7,*16*	..,..,*13*,..,..,..
7	*1*, 3, 2, *6*, *2*, *8*	7, *8*,..,.., *8*, *5*	3, 4,.., 0, *7*, *1*	*1*, *1*, 6, 1, *5*, *1*	*6*, *5*, *2*,*18*, *5*,*11*	..,..,..,..,12,..
F 2	*4*, *2*, *7*, 5, 4, *2*	*2*, 7, 4, *2*,12, *6*	*6*, 2,.., 3, 3, *2*	*6*, *3*, *1*,12, 3, 8	*4*, *4*,.., *3*, 7,..	*12*, 8,..,..,..,*22*

Region.	Draper Cat. Magn. B.	Draper Cat. Magn. 4.5.	Draper Cat. Magn. 5.0.	Draper Cat. Magn. 5.5.	Draper Cat. Magn. 6.0.	Draper Cat. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	11,34,69,**19**, R,**60**	.., 8,..,52,**12**,..	.., 8,18,21,94,**15**	.., 0,15,16,60,91	..,*15*,19,44,45,60	..,*20*,14, 6,32,38
B 4	..,14,67,62,..,**68**	..,12,39,..,94,..	..,15,29,64,66,..	37, *7*,27,48,65,82	.., *4*, 9,34,43,40	..,*11*,*16*, 7, 8,18
5	..,66,..,..,**24**,..	..,..,62,89,..,..	.., 8,49,..,92,..	.., 4,46,24,88,**07**	..,11,33, 5,60,96	.., 2, 5,34,44,55
6	23,..,48,73,**22**,..	.., 9,52,..,..,..	..,11,39,60,76,**24**	*11*, *2*,36,..,77,**06**	.., 6,43,70,80,55	.., 1,23,31,48,..
7	2, *4*,..,96,**41**, R	.., 8,21,..,**13**,..	..,10,48,73,97,**42**	*7*,11,40,88,80,**19**	.., 8,46,67,80,**28**	*33*, 7,18,41,54,..
C 6	14,26,..,53,..,**25**	.., 8,44,25,..,**40**	.., *7*, 4,60,60,**11**	.., *4*, 2,44,55,76	*26*, *1*, 5,29,38,84	..,*13*,*24*,14,24,..
7	..,..,..,99,**28,70**	..,31,..,78,**20,36**	..,18,40,78,84,**11**	.., 3,*15*,52,54,**17**	*6*, *3*,30,16,64,57	.., *9*,16,28,39,27
8	..,22,44,68,**42**,..	..,10,..,63,85,**22**	.., 9,26,29,**01,42**	.., *2*,10,47,58,73	.., *4*,15,14,38,25	.., *9*,*15*,12,28,..
9	29,30,64,..,**12**,..	12, 2,..,..,**36,39**	8,26,47,..,**04,17**	14, *3*,53,99,78,91	.., 2,27,50,76,81	..,*21*, 9,30,20,..
D 6	..,21,..,..,**14,43**	..,20,26,..,64,..	9,*13*,..,56,59,**58**	11,12,31,26,56,72	.., 2,24, 7,50,..	..,*23*, 2,*11*, 9,11
7	50,36,44,..,**34**,..	..,14,41,..,..,..	*6*,..,51,..,81,**13**	*18*, *5*,22,50,68,..	..,*10*,*18*,24,43,..	..,*21*, *5*,.., 3,..
8	50,26,..,65,**15,80**	20,*11*, 0,..,**04**,..	20,11,*27*,22,62,**20**	*36*,*12*, 1, *7*,60,60	..,*40*, *4*,26,19 ..	*10*,*52*,18,*36*,*10*,..
S C 1	59,..,95,73,**30**,..	..,16,..,..,**00,05**	..,..,27,..,66,**17**	*4*, 0,34,51,54,89	*42*, *1*,12,14,34,54	..,*18*,13, *2*,29,33
2	33,41,..,..,**44,81**	17, 4,42,..,81,..	*6*,20,33,..,59,..	*14*, 4,26,12,75,..	28,*19*, 2,20,31,52	*32*,*20*, 6, 2, *2*,..
12	18,52,..,90,**15**, R	16,..,36,79,**11**,..	6, 5,..,..,82,**10**	*9*, 8,27,..,50,59	.., *6*,12,38,46,..	..,*22*,*17*, 8,22,13
D 1	..,..,..,..,**23,29**	..,..,..,..,**19,32**	.., *2*,32,..,77,61	.., 4,11,..,55,81	..,*10*,16,10,36,32	..,*32*, 3, 9,18,..
2	10,44,..,93,**00,68**	0,35,..,46,..,**14**	14, 6,37,14,72,..	*12*,*18*, *1*,37,50,29	.., *4*,*15*,27, *1*,65	..,*43*,*24*, *2*, *5*,*25*
11	.., 5,52,**01,16**,..	*8*,..,..,73,91,..	*14*,29,20,..,45,..	*7*,26,*17*,..,68,..	..,*22*,*35*, *3*,..,..	..,*47*,..,..,..,*74*
12	18,21,..,**16,02,28**	4,48,..,..,**02,31**	34, 5,54,48,87,**22**	16, *6*,24,..,52,..	..,*20*,*31*,26,14,..	..,*24*,64,.., 8,..
E 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
2	..,..,..,..,**64**,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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P A 1	50,32,..,..,..,..	32, 9, 5,..,**33,37**	*4*, 4,60,30,63,**00**	*5*, *7*,32,18,53,**08**	..,*24*, 6,54,46,84	..,*29*, *9*,27,11,79
3	46, *2*,..,55,**24**,..	..,31,59,..,85,..	19,19,36,40,78,85	*6*, 6,23,..,62,99	*11*,*11*, 6,23,45,61	*3*,*26*, *1*, 9,34,85
B 1	24,40,90,91,**35**, R	14,25, 7,..,..,..	4,10,38,45,92,69	*1*, *4*,40,51,63,56	*25*,*12*,11,33,38,46	*52*,*27*,*12*, 3,29,..
3	..,83,49,..,96,..	..,14,..,..,69,**04**	16,15,20,86,**14,23**	*22*,11,40,46,83,72	.., 7,30,22,41,**00**	..,*20*, *8*, 2, *4*,..
C 3	24,44,17,86,**29**, R	4, 9,28,47,95,**23**	7,24,26,43,69,**14**	*12*, 4,17,19,83,..	*28*, *9*, 6,28,30,..	*14*,*27*,*10*, 0, 4,..
5	..,12,..,85,**20**,..	*13*, *1*,18,..,**01,24**	13, 6,42,91,78,**34**	.., 5, *2*,69,65,**00**	..,*12*, 7,13,31,32	..,*18*,14, 4,18,47
11	*3*,..,50,66,**33**,..	..,22,..,60,59,..	*1*,10,40,58,**03**,..	.., 9,20,82,76,*34*	*32*,*21*,13,24,51,..	..,*28*, *3*,*29*,15, 2
D 3	10,43,72,70,**09,47**	4, *8*,48,..,88,**51**	*11*,14,39,..,88,99	*16*, 0,24,19,49,81	*23*, *8*,10,20,41,16	*50*,*22*, *9*, *6*, 0,..
5	.., 2,..,94,**49**,..	8,23,..,85,84,..	3, 9,51,41,65,88	*19*, *1*,24,31,58,28	*3*,*10*, 8, *6*, *3*,..	..,*40*,*35*,*34*,..,..
9	45,42,34,..,98,**95**	23, 0,28,52,64,..	2, 7,63,..,92,..	*73*, *6*,10,62,32,42	*49*,*29*,*48*,*22*,17,19	..,*20*,*18*,*19*,*13*,..
E 5	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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M B 2	55,..,..,86,**48**,..	40,32,57,**11,08,15**	10,12,59,39,84,..	*7*, *5*,25,65,75,..	*18*, *4*,15,38,44,54	*15*,*29*, *8*,*23*,16,43
8	..,18,49,58,**15,64**	5,30,..,55,**20,33**	8,14,45,67,98,..	*4*, 5,26,64,76,90	*5*,*11*,27,42,49,..	*13*,*15*,36,*27*,12,..
9	29, 9,42,..,**25**,..	*1*,22,18,51,**20**,..	3,22,24,81,96,**15**	*17*,12,43,52,61,88	8, 1,20,17,37,..	*35*,*20*,*19*,39, 2,51
C 4	14,37,62,58,**14,50**	*6*, 7,16,..,91,..	1, 4,..,32,85,**01**	*20*, 0,*11*,35,56,**03**	*40*,*21*, *3*,13,42,24	*39*,*34*,*13*,*13*, *4*,..
10	..,35,59,..,**24,64**	10,14,28,77,86,**04**	17,13,46,68,93,..	*10*,11,30,57,60,89	*36*, *4*,20,24,40,..	..,*33*, *5*,*24*,35,..
D 4	45,45,..,**14**,00,70	3, 7,..,45,72,**20**	*8*,10,..,29,73,67	*20*, *2*, 6,20,53,74	*38*,*26*,*15*, *5*,15,10	*78*,*30*,*14*,*60*,..,..
10	37,28,78,..,**18**,..	**46**, 4,18,36,95,**41**	25,20,35,65,63,73	*11*, *5*,*16*,44,53,49	1,*32*,*18*, *6*,34,..	..,*25*,*16*, 5,14,..
E 3	35,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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Region.	Cape P.D. Magn. B.	Cape P.D. Magn. 4.5.	Cape P.D. Magn. 5.0.	Cape P.D. Magn. 5.5.	Cape P.D. Magn. 6.0.	Cape P.D. Magn. 6.5.
	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M	B A F G K M
N A 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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6	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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C 6	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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D 6	..,..,..,..,..,..	..,50,..,..,..,..	..,..,..,60,..,**90**	**5,00**,..,**30,55,70**	..,73,90,80,75,..	..,58,82,63,93,50
7	..,..,80,..,**87**,..	..,..,..,..,..,..	50,..,..,..,**50**,..	20,30,90,80,**47**,..	..,50,**02,13,38**,..	..,52,65,57,**02**,..
8	50,..,..,..,**85**, R	50,*20*,..,.., R,..	25,*10*,..,60,**72**,..	..,52,70,35,**48,60**	..,40,60,..,**21**,..	40,63,95,50,00,..
S C 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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12	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
D 1	..,..,..,..,..,**20**	*90*,..,..,..,..,**10**	..,*10*,60,..,..,**00**	..,13,60,..,86,**30**	..,17,*10*,..,98,**05**	..,10,10, 5,**00**,..
2	..,20,..,20,..,**70**	*70*,*40*,..,10,..,..	*50*,45,..,..,95,..	..,60,27,**10**,..,..	..,20,00,78,80,00	.., 3, 3,80,98,90
11	..,..,..,**50**,.., R	*10*,..,..,*20*,**90**, R	.., 0,..,..,**60**,..	..,30,**90,50,40,70**	*50*,52,36,98,**23,40**	..,70,58,87,**02**,80
12	*80*,..,..,..,**35**,..	..,40,..,..,..,**90**	.., 0,..,40,**25**,..	*10*, 3,20,..,**14**,..	..,23, 0, 0,81,..	.., 6,30,55,65,**10**
E 1	40,30,..,..,**90**, R	80,50,..,..,**35,90**	..,22,..,97,**40,40**	..,30,86,92,**17,10**	..,52,37,80,63,**12**	..,22,33,70,62,55
2	.., 5,..,..,**47,60**	..,..,**20**,60,**32**,..	*36*,*60*,**50**,85,**35**, R	..,..,60,**08,33**,..	30,42,71,45,**00,00**	*30*,21,23,64,94,**15**
8	90,70,..,.., R,..	*40*,..,47,..,**60**,..	..,20,**15**,75,**77,88**	20,45,72,75,**49,30**	40,35,63,15,**05,30**	43,40,55,32,99,87
9	70,13,40,..,**50**, R	..,34,*30*,**20,73,65**	*90*,33,..,**05,10,30**	*90*,35,50,80,**19,45**	70,38,22,36,**03,35**	*5*, 8,40,51,73,**10**
F 1	..,..,65,**33,23**, R	..,*70*,50,80,**67**, R	15, 0,20,40,**50,74**	*15*, 8,73,70,**24,80**	30, 1,51,60,**10,50**	*27*,*16*,32,60,**17,23**
P A 1	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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D 3	..,..,..,85,**70**, R	..,*10*,..,..,**20,60**	..,*30*,60,..,**65**,..	..,*10*,45,..,**20**,..	..,48,85,**35,16,40**	..,65,20,80,**15**,70
5	..,..,..,**80**, R,..	*30*,..,..,..,..,..	..,55,80,**53,50,87**	..,27,40,**00,80**,..	20,47,84,..,**12**,..	*20*,59,88,90,98,..
9	10,..,..,..,.., R	0,..,20,73,**20**,..	*20*,50,70,**80**,..,..	0,70,**10**,..,**55**, R	**25**,44,50,63,**13**,..	70,20,85,63,73,..
E 5	52,**27**,..,**85**, R,..	40,75,70,40, R,..	22,60,**00,37,90,87**	34,41,85,**77,73,96**	77,62,**09,11,59,66**	67,48,80,**12,31,38**
F 3	..,60,70,**90,89**,..	*30*,*30*,40,*20*,**63**,..	*10*,*17*,..,97, R,**90**	*60*,54,47,70,**21,37**	0, **2**,32,66,**20,45**	30,19,23,88,**03**,98
M B 2	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
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10	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..	..,..,..,..,..,..
D 4	**20,30**,.., R, R, R	62,80,..,**13**,..,..	50,80,..,.., R, R	41,50,..,**42**, R,**90**	54,60,**13,13,64,90**	73,56,90,**26,40,63**
10	43,..,50,..,**98**,..	..,10,..,..,**95**, R	..,*20*,**10**,80,**66,40**	*25*,25,00,..,**62,60**	*15*,55,45,88,**40**,..	..,39,90,40,**21,45**
E 3	42,90, R,.., R, R	10,30,**10**,..,**05**,..	19,22,**25,65,91,92**	27,38,90,**45,51,87**	35,41,83,**23,32,47**	56,54,75,88,**18,52**
4	64,90,**30,30**, R, R	10, 0,**00,03**, R, R	41,60,**02,63**, R, R	49,57,**07,73,83**, R	49,58,**22,22,58,85**	52,65,84,**07,38,30**
6	60,62,..,..,**80**, R	29,90,**40**,70, R, R	20,95,**00,50**, R, R	30,65,00,**42,66**, R	62,94,87,**01,36,42**	40,45,79,84,**08**,98
7	78,**90**, R,**80**, R, R	17,**00**,..,.., R, R	75,82,..,**50,90**, R	74,98,**35,20,75,68**	40,73,**11,26,41,70**	48,63,84,82,**29,60**
F 2	67,**33**,90,70, R, R	30,80,**00,40,90**, R	38,76,..,**68**, R, R	35,51,81,**15,79**, R	21,31,69,**35,85,84**	31,30,60,93,**27,43**

Region.	No. of Stars. Magn. B.						No. of Stars. Magn. 4.5.						No. of Stars. Magn. 5.0.						No. of Stars. Magn. 5.5.						No. of Stars. Magn. 6.0.						No. of Stars. Magn. 6.5.					
	B	A	F	G	K	M	B	A	F	G	K	M	B	A	F	G	K	M	B	A	F	G	K	M	B	A	F	G	K	M	B	A	F	G	K	M
N A 2	1	2	1	1	1	2	..	1	..	2	2	..	..	2	2	2	7	3	..	7	3	3	8	5	..	18	6	2	15	1	..	17	6	2	25	3
B 4	..	3	2	2	..	2	..	3	1	..	4	..	..	1	8	2	1	..	1	8	4	2	10	2	..	17	9	8	16	2	..	13	2	7	11	3
5	..	6	..	..	4	..	..	..	1	1	..	..	..	5	3	..	7	..	..	3	4	1	8	1	..	13	5	1	12	8	..	11	5	7	9	4
6	2	..	2	1	4	..	..	3	2	..	1	..	..	2	4	2	1	4	1	14	4	..	7	5	..	20	3	5	20	2	..	12	12	6	15	1
7	2	2	..	3	4	1	..	2	1	..	2	..	..	5	2	5	2	4	4	8	2	2	4	3	..	21	1	5	13	6	2	13	4	7	33	2
C 6	2	5	1	2	..	1	..	3	1	1	..	1	..	4	1	2	2	1	..	7	1	3	5	4	1	9	3	6	11	2	..	11	4	6	11	..
7	..	..	..	1	2	1	..	1	..	2	1	1	..	7	3	3	6	3	..	10	1	4	3	1	1	15	4	2	16	4	..	14	7	11	11	3
8	..	5	1	1	3	..	..	1	..	1	4	2	..	3	2	2	3	2	..	7	4	1	10	2	..	14	5	5	15	5	..	5	6	5	5	2
9	1	3	2	..	5	..	1	2	..	..	2	1	2	3	1	..	1	3	2	11	4	1	13	1	1	28	6	7	10	6	..	13	8	6	15	5
D 6	..	1	..	..	4	1	..	2	1	..	1	..	1	3	..	2	4	2	2	6	1	3	4	1	..	16	5	5	11	3	..	11	5	9	17	2
7	2	3	1	..	3	..	..	1	1	..	..	..	1	..	1	..	5	3	1	4	3	4	9	..	..	14	9	10	9	1	..	8	5	6	12	1
8	5	2	..	2	3	1	2	2	1	..	4	..	3	3	1	1	9	1	2	11	3	3	9	1	..	18	5	3	17	1	1	7	4	8	11	2
S C 1	1	1	1	1	1	..	..	1	..	..	8	1	..	..	2	..	4	1	1	6	7	1	9	3	1	15	8	2	15	2	..	6	4	3	12	6
2	6	2	..	..	2	1	4	1	1	..	7	..	3	4	2	..	2	..	10	13	5	2	4	..	3	19	7	8	14	4	1	11	5	9	10	2
12	1	2	..	3	3	1	2	..	2	3	3	..	2	4	..	..	5	2	1	5	3	..	5	3	..	15	7	3	13	2	..	8	6	5	19	4
D 1	..	..	..	..	6	1	1	..	..	..	1	1	..	1	6	..	3	1	..	6	4	..	12	3	..	7	5	4	16	3	..	10	1	8	16	1
2	1	1	..	1	3	2	2	2	..	2	..	1	2	5	2	2	2	..	3	8	6	5	3	3	..	10	5	11	15	1	..	9	7	3	13	3
11	..	3	2	3	1	1	2	..	..	2	4	2	1	3	4	..	3	..	3	5	2	1	9	3	1	17	10	12	12	2	1	11	9	7	14	2
12	2	2	..	1	2	2	2	3	..	..	2	3	1	3	2	2	3	1	3	9	3	..	12	..	..	11	3	4	24	1	..	14	5	6	24	3
E 1	3	1	..	..	6	1	1	2	..	..	2	1	..	6	..	3	1	1	..	2	7	4	10	1	..	4	6	10	12	4	..	6	10	3	13	4
2	..	2	..	..	3	1	..	..	1	1	6	..	3	1	2	2	2	1	..	..	3	4	6	..	1	4	9	2	13	2	1	15	7	7	14	4
8	3	2	..	..	4	..	1	..	3	..	2	..	..	5	2	2	6	4	3	10	4	2	10	4	3	6	6	2	15	5	3	8	12	4	19	6
9	1	3	1	..	4	1	..	5	1	1	3	2	1	3	..	2	5	1	1	2	6	1	15	4	1	4	5	5	10	2	2	4	12	9	20	2
F 1	..	..	2	3	3	1	..	4	1	1	3	2	2	3	1	3	5	5	2	6	3	3	16	6	1	9	9	2	15	4	3	11	4	8	15	3
P A 1	2	1	..	1	..	..	1	3	1	..	1	1	4	3	1	1	1	2	5	14	3	2	9	5	..	23	12	1	15	2	..	27	9	2	19	2
3	2	1	1	1	6	..	..	4	1	..	4	..	4	3	4	4	9	2	2	15	7	..	9	4	1	23	5	4	18	4	1	21	7	3	23	4
B 1	2	2	2	4	3	2	4	2	1	..	..	..	5	6	4	6	5	1	5	11	2	3	9	3	1	27	13	5	10	1	2	25	8	11	20	2
3	..	3	1	..	2	..	..	2	..	..	4	1	1	4	2	1	5	1	1	12	3	4	12	1	..	25	4	11	16	2	..	20	5	7	21	5
C 3	5	2	1	2	3	2	7	8	3	1	5	1	6	9	5	2	7	1	10	38	7	2	7	1	5	36	10	4	15	1	2	30	7	3	13	2
5	..	2	..	3	4	..	1	2	1	..	1	2	1	2	1	1	4	1	..	8	2	3	5	2	..	16	4	4	10	4	..	18	6	9	11	6
11	2	..	1	1	3	..	..	2	..	2	2	..	4	6	1	1	3	1	..	13	4	3	8	1	3	19	7	7	12	4	..	14	7	11	17	10
D 3	9	3	1	4	3	1	7	2	1	..	3	1	6	6	3	1	6	1	10	11	5	1	5	1	4	35	10	4	16	4	8	19	8	5	14	2
5	..	1	..	1	3	..	2	1	..	3	2	..	1	5	1	4	8	4	2	10	2	4	5	1	2	17	9	3	20	1	1	24	11	5	14	1
9	5	1	1	..	2	2	2	3	5	3	2	..	2	5	1	1	3	..	1	7	3	1	6	2	2	18	7	8	12	1	1	8	13	7	14	3
E 5	5	3	..	2	4	..	4	2	1	1	5	..	10	2	1	3	2	3	6	18	3	3	6	5	7	21	8	8	15	7	4	23	10	4	16	6
F 3	..	1	1	1	7	..	1	1	2	1	3	..	1	3	..	3	3	6	1	9	6	1	13	3	1	9	6	7	22	4	3	17	9	5	23	4
M B 2	7	..	..	7	4	..	2	5	1	2	1	1	5	9	4	1	10	..	10	20	5	1	4	..	6	30	9	6	11	1	1	27	7	3	19	1
8	..	5	1	2	5	1	5	1	1	2	3	2	12	6	5	3	11	..	7	17	4	2	10	2	5	45	11	7	26	4	10	41	10	14	24	10
9	1	1	1	..	4	..	4	3	1	1	4	..	9	1	2	1	8	1	4	22	2	3	11	3	2	34	7	3	17	..	1	37	11	6	23	4
C 4	2	2	1	2	4	2	3	1	1	..	5	..	1	9	..	4	7	1	1	15	4	2	6	2	2	48	4	8	22	10	3	35	9	10	18	4
10	..	3	2	..	5	2	2	2	2	2	4	1	7	4	3	2	5	..	2	27	9	4	13	3	2	21	8	3	12	..	1	41	11	8	19	6
D 4	6	3	..	2	4	1	9	4	..	3	1	1	10	4	..	1	8	5	10	20	3	7	10	5	15	39	11	9	19	6	6	27	10	8	9	5
10	3	1	2	..	8	..	2	2	1	1	2	2	2	4	1	3	10	2	4	10	4	3	11	2	4	20	12	8	16	3	..	20	12	11	18	5
E 3	5	1	1	..	6	3	8	1	1	..	4	..	11	6	4	2	10	5	11	17	6	10	14	3	22	29	13	8	18	7	12	31	14	4	33	4
4	9	3	4	2	4	4	3	1	2	3	4	4	17	6	4	3	8	3	13	17	3	3	11	3	16	27	11	5	26	6	10	38	11	14	22	8
6	18	4	..	1	4	2	10	1	1	3	3	2	8	4	2	3	4	1	5	11	1	4	8	2	11	21	7	9	21	5	7	27	11	5	28	6
7	10	1	2	1	7	4	3	1	..	..	3	1	6	4	..	2	5	1	14	12	2	7	10	4	13	27	8	8	24	6	10	25	13	8	15	1
F 2	7	3	4	2	4	3	5	1	1	2	2	1	9	5	..	4	8	2	6	20	9	4	15	3	8	25	8	13	30	8	8	30	3	7	14	3

The only residuals in Table III, exceeding 99, are found on pages 111 and 112, and these occur only in the case of red stars, which would necessarily be faint in the photographs. Residuals from 100 to 199 are shown by placing the two right-hand figures in heavy-faced type. Residuals of 200 or more are indicated by the letter R, the exact value in each case being given in Table IV. Only five of these occur on page 111, the grouping of the Draper Catalogue. The remainder are from page 112, the Cape Photographic Durchmusterung. The Catalogue is indicated in the first column

TABLE IV.

LARGE RESIDUALS.

Cat.	Region.	Magn.	Spectrum.	Residual.	Cat.	Region.	Magn.	Spectrum.	Residual.
D. C.	N A 2	B	K	215	C. P. D.	M E 3	B	F	220
“	“ B 7	“	M	203	“	“ “	“	K	207
“	S C 12	“	“	219	“	“ “	“	M	315
“	P B 1	“	“	220	“	“ “	4.5	K	205
“	“ C 3	“	“	288	“	“ E 4	B	“	245
C. P. D.	N D 8	“	“	280	“	“ “	“	M	312
“	“ “	“	K	245	“	“ “	4.5	K	250
“	S D 11	“	M	250	“	“ “	“	M	255
“	“ “	4.5	“	220	“	“ “	5.0	K	204
“	“ E 1	B	“	200	“	“ “	“	M	223
“	“ E 2	5.0	“	220	“	“ “	5.5	“	217
“	“ E 8	B	K	232	“	“ E 6	B	“	270
“	“ E 9	“	M	300	“	“ “	4.5	K	207
“	“ F 1	“	“	290	“	“ “	“	M	205
“	“ “	4.5	“	210	“	“ “	5.0	K	212
“	P D 3	B	“	250	“	“ “	“	M	210
“	“ D 5	“	K	210	“	“ “	5.5	“	215
“	“ D 9	“	M	300	“	“ E 7	B	F	220
“	“ “	5.5	“	200	“	“ “	“	K	264
“	“ E 5	B	K	218	“	“ “	“	F	290
“	“ “	4.5	“	244	“	“ “	4.5	K	210
“	“ F 3	5.0	“	200	“	“ “	“	M	210
“	M D 4	B	G	265	“	“ “	5.0	“	280
“	“ “	“	K	270	“	“ F 2	B	K	238
“	“ “	“	M	340	“	“ “	“	M	273
“	“ “	5.0	K	230	“	“ “	4.5	“	280
“	“ “	“	M	280	“	“ “	5.0	K	201
“	“ “	5.5	K	203	“	“ “	“	M	240
“	“ D 10	4.5	M	225	“	“ “	5.5	“	227

of Table IV, and the region in the second column, the latter being taken from the first column of Table III. The third column gives the magnitude, and the fourth, the class of spectrum taken from the headings of Table III. The numerical value of the residual is given in the fifth column.

The results of Table III are grouped in Tables V to X. The algebraic means of the residuals in each twelve lines of Table III are taken, thus placing together all stars in the twelve regions north of the Milky Way, those south of it, those partly in it, and those mainly in it. We thus obtain thirty-six residuals, six from each of the six columns, for each twelve lines in Table III. They are arranged in the sections of Tables V to X. The first column gives the region, indicated by the letters N, S, P, and M, and the magnitude in the six lines marked B, 4.5, 5.0, 5.5, 6.0, and 6.5. The seventh line gives the results for all, taking the mean, not of the six preceding lines, but of the residuals from which they were derived. The first twenty-eight lines, accordingly, give the results for the four divisions of the sky, separately. The next seven lines give the results from all, again derived from the separate residuals of Table III. The second to eighth columns give the results for the classes of spectra indicated in the headings of the columns, and of all combined. The Catalogues discussed are indicated in the first line of the heading. The last line of each page gives the results for each class of spectrum, for all the stars regardless of magnitude.

The Henry Draper Memorial has furnished all the material for this classification, and the notation is that adopted in this work. Each letter here represents a particular type of spectrum, and the designation employed is of little importance. The Classes designated by these letters are illustrated by Plate 1.

All of the photographs were made at Cambridge, with the 11-inch Draper Telescope, except the third, α Carinae, which was photographed at Arequipa, with the 13-inch Boyden Telescope. The first spectrum, Class B, is that of ε Orionis, taken on December 23, 1893, with an exposure of 68^m. The second spectrum, Class A, α Canis Majoris, was taken on October 15, 1893, with an exposure of 60^m. The third spectrum, Class F, α Carinae, was taken on August 4, 1896, with an exposure of 34^m. The fourth spectrum, Class F 5, α Canis Minoris, was taken on December 7, 1893, with an exposure of 60^m. The fifth spectrum, Class G, α Aurigae, was taken on December 21, 1899, with an exposure of 113^m. The sixth spectrum, Class K,

TABLE V.

RESIDUALS OF H. A. 14, 23, AND 24,1.

Magn.	H. A. 14.							H. A. 23.							H. A. 24,1.						
	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.
N B	5	5	7	5	*1*	*1*	3	..	*3*	*2*	0	0	0	0	*9*	*7*	..	5	9	*13*	*3*
4.5	11	2	3	*1*	0	*10*	1	..	..	..	*2*	..	..	*2*	..	*10*	*5*	..	1	..	*4*
5.0	*4*	2	1	1	0	2	1	..	*5*	1	..	0	2	0	1	*6*	*7*	*2*	*5*	*15*	*7*
5.5	*3*	1	2	4	3	4	2	..	0	*5*	..	*2*	*1*	*1*	..	*3*	1	*10*	*2*	4	*2*
6.0	*12*	*2*	*3*	*5*	2	5	*1*	..	0	0	..	0	..	0	..	2	0	5	*2*	*7*	0
6.5	*6*	*3*	*3*	*2*	0	6	*2*	..	..	..	..	*1*	..	*1*	..	3	2	*3*	0	2	0
All	0	1	1	0	1	2	1	..	*1*	*1*	0	0	0	*1*	*6*	*1*	*1*	*2*	*1*	*4*	*2*
S B	4	*2*	4	*3*	*7*	*9*	*3*	..	*10*	..	..	*6*	14	*4*	36	15	*27*	*5*	15	17	10
4.5	*11*	*3*	4	0	2	*8*	*3*	*12*	*3*	..	..	0	..	*3*	5	1	*7*	8	14	0	5
5.0	*2*	*3*	0	*10*	1	*7*	*2*	4	*1*	..	*6*	*4*	3	*1*	..	0	9	16	11	..	8
5.5	*3*	*2*	*6*	8	*1*	6	0	*26*	*9*	*5*	*6*	2	1	*5*	8	8	2	6	4	2	6
6.0	*7*	*4*	*1*	2	0	*2*	*1*	*15*	*4*	1	0	*5*	0	*4*	3	7	8	3	4	6	5
6.5	..	*5*	*1*	0	1	3	*1*	..	*19*	..	..	..	48	3	..	8	7	1	7	3	6
All	*4*	*3*	*1*	1	*1*	*3*	*2*	*10*	*7*	*2*	*5*	*2*	8	*3*	9	7	5	3	8	5	6
P B	5	0	0	1	*1*	*8*	0	*1*	*11*	*3*	*4*	*1*	1	*4*	*2*	*3*	6	*12*	0	35	0
4.5	*4*	*1*	*2*	2	*2*	*11*	*3*	*3*	1	*6*	..	*2*	7	*2*	*7*	0	8	*5*	*4*	12	*1*
5.0	*2*	*2*	*1*	*2*	*2*	8	0	*2*	*7*	2	*2*	*4*	*4*	*3*	6	*2*	2	12	15	*12*	5
5.5	*3*	*3*	*2*	1	4	3	0	..	*3*	0	..	3	2	1	*6*	3	4	1	2	7	2
6.0	*4*	*5*	*2*	*1*	*1*	*2*	*2*	*18*	*5*	*5*	*2*	2	*4*	*4*	5	2	5	0	4	7	3
6.5	2	*6*	0	*5*	0	0	*2*	..	*9*	10	..	..	4	2	7	2	2	0	4	4	3
All	*1*	*3*	*1*	*1*	0	0	*1*	*4*	*5*	*2*	*3*	0	1	*2*	0	2	4	*1*	4	5	2
M B	1	5	7	*3*	*9*	*13*	*2*	*14*	*6*	..	2	9	3	*1*	*9*	*10*	..	*3*	10	..	2
4.5	*2*	0	10	*5*	*2*	6	1	*11*	*4*	*16*	2	*4*	8	*3*	5	*2*	*5*	11	..	..	4
5.0	*3*	2	0	*1*	1	*4*	*1*	*12*	*13*	*12*	0	5	..	*7*	*1*	*1*	8	2	0	4	1
5.5	*4*	*5*	*1*	*2*	2	4	*1*	*13*	*16*	*12*	*5*	4	24	*6*	5	2	0	10	3	3	4
6.0	*2*	*3*	0	*1*	0	5	*1*	1	*10*	*12*	..	*4*	4	*6*	3	2	8	1	5	*15*	3
6.5	*10*	*8*	4	2	*2*	8	*1*	*16*	..	*13*	..	..	..	*14*	4	2	6	1	1	*5*	1
All	*3*	*1*	3	*2*	*2*	1	*1*	*11*	*11*	*12*	*1*	2	7	*5*	2	1	5	4	4	*4*	2
A B	4	2	4	1	*4*	*7*	0	*10*	*8*	*2*	*1*	2	4	*2*	*1*	*4*	*10*	*5*	9	13	2
4.5	*4*	0	3	*2*	0	*5*	*1*	*10*	*2*	*9*	1	*2*	8	*2*	1	*4*	0	5	4	4	1
5.0	*2*	0	0	*1*	0	2	0	*5*	*7*	*5*	*4*	0	0	*4*	2	*2*	2	4	7	*9*	1
5.5	*3*	*2*	*1*	2	2	4	0	*16*	*8*	*6*	*5*	2	5	*4*	2	2	2	*1*	1	5	2
6.0	*5*	*3*	*2*	*2*	0	2	*1*	*9*	*5*	*6*	*1*	*2*	1	*4*	3	3	5	2	2	*2*	3
6.5	*5*	5	0	*2*	0	4	*1*	*16*	*16*	2	..	*1*	26	*2*	6	3	4	*1*	3	0	2
All	*2*	*1*	0	0	0	0	*1*	*9*	*7*	*5*	*2*	0	5	*3*	2	1	3	1	3	0	2

TABLE VI.

RESIDUALS OF 24,4, 34, AND 44.

Magn.	H. A. 24,4.							H. A. 34.							H. A. 44.						
	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.
N B	*3*	*5*	*3*	2	4	5	0	..	..	..	..	..	*21*	*21*	*1*	1	*2*	*1*	*1*	4	0
4.5	*8*	3	*12*	4	0	2	*1*	6	..	..	..	*6*	..	0	*2*	*4*	*1*	3	0	0	*1*
5.0	4	0	2	*5*	1	6	1	..	..	..	12	..	..	12	*4*	0	*4*	*1*	2	4	0
5.5	*4*	1	*3*	3	2	0	0	..	1	..	10	..	..	6	1	*3*	0	0	*1*	*1*	*1*
6.0	19	0	0	6	0	0	1	..	6	15	..	*7*	..	5	0	*1*	*1*	*1*	*1*	*3*	*1*
6.5	..	5	*4*	5	2	4	2	11	14	..	..	*22*	..	1	*5*	*2*	3	0	*1*	*4*	*1*
All	0	1	*2*	2	2	3	1	8	7	15	11	*12*	*21*	2	*1*	*2*	*1*	0	0	0	*1*
S B	*5*	3	15	2	11	14	5	*12*	6	*8*	*7*	*6*	*10*	*6*	*5*	*5*	0	*2*	1	4	*1*
4.5	7	*1*	15	*2*	*1*	*8*	0	7	4	*3*	*2*	*11*	*13*	*3*	*4*	*8*	4	*1*	1	11	0
5.0	*10*	3	*6*	18	10	10	4	*2*	*1*	*7*	*5*	*3*	*8*	*4*	*6*	*6*	*3*	*2*	*3*	6	*3*
5.5	7	0	4	*16*	5	*3*	1	2	3	0	*4*	*9*	*6*	*3*	*8*	*2*	*2*	0	3	0	*1*
6.0	1	3	4	8	3	2	4	6	2	*4*	*2*	*8*	*8*	*3*	*2*	*6*	*6*	*5*	*1*	2	*3*
6.5	..	5	7	6	2	14	6	*10*	2	*2*	*5*	*3*	*7*	*3*	..	*4*	*10*	*4*	0	*9*	*5*
All	0	2	5	3	4	5	3	*2*	2	*3*	*4*	*7*	*8*	*4*	*5*	*5*	*4*	*3*	0	3	*2*
P B	*6*	1	4	1	2	10	1	0	*2*	*6*	2	*3*	..	*1*	*4*	*1*	*2*	2	2	4	0
4.5	7	1	11	12	16	..	9	*3*	*2*	*2*	*6*	*5*	..	*4*	0	*3*	*4*	*4*	2	2	*1*
5.0	6	0	1	*1*	*2*	*8*	0	3	*2*	16	2	2	*8*	2	1	*2*	*2*	4	1	*1*	0
5.5	*2*	4	9	3	4	2	4	*2*	*1*	2	*4*	*8*	*8*	*4*	0	*1*	*2*	0	*1*	1	*1*
6.0	7	2	3	6	1	*4*	3	1	1	*1*	0	*1*	*18*	*5*	0	0	*1*	*2*	0	1	*1*
6.5	3	3	*5*	4	4	*3*	2	*3*	10	*4*	*10*	2	*13*	0	*4*	0	*2*	2	*1*	*3*	*1*
All	3	2	4	4	4	0	3	0	2	2	*3*	*2*	*13*	*2*	*1*	*1*	*2*	1	0	0	*1*
M B	*2*	*5*	*8*	6	2	10	1	*1*	*3*	*6*	*10*	*8*	*16*	*7*	*1*	*3*	0	2	5	13	3
4.5	6	0	..	2	*4*	*2*	0	2	*6*	2	*3*	*9*	*12*	*5*	*3*	*5*	*7*	*1*	2	*1*	*2*
5.0	4	6	*5*	*2*	3	8	3	5	4	1	*5*	*6*	*5*	*1*	*4*	*1*	*1*	3	4	1	0
5.5	8	1	0	2	*1*	1	2	10	4	1	*2*	*3*	*4*	2	*5*	*3*	*2*	1	2	5	0
6.0	10	4	1	*3*	2	9	4	4	5	2	0	*2*	*4*	1	*3*	*5*	*2*	0	2	*1*	*2*
6.5	11	4	*15*	9	4	2	3	9	5	3	2	*2*	*5*	2	2	*2*	*4*	*4*	1	7	*1*
All	7	2	*4*	2	1	6	2	5	2	0	*3*	*5*	*8*	*1*	*3*	*3*	*3*	0	3	4	0
A B	*4*	*1*	0	2	4	10	2	*4*	*0*	*6*	*6*	*6*	*14*	*6*	*3*	*2*	*1*	0	2	7	0
4.5	4	1	4	4	3	*2*	3	3	*3*	*2*	*4*	*8*	*13*	*4*	*2*	*5*	*3*	*1*	1	3	*1*
5.0	3	2	0	*2*	3	5	2	2	1	1	*2*	*4*	*7*	*2*	*3*	*2*	*2*	1	1	2	0
5.5	2	2	3	1	2	0	2	6	3	1	*2*	*7*	*5*	*1*	*3*	*2*	*2*	0	1	1	*1*
6.0	8	2	2	5	1	1	3	4	4	0	*1*	*5*	*10*	*1*	*2*	*3*	*3*	*2*	0	0	*2*
6.5	9	4	*3*	6	3	5	3	2	5	0	*3*	*3*	6	*1*	*1*	*2*	*3*	*1*	0	*3*	*2*
All	3	2	1	3	3	4	2	2	2	*1*	*3*	*5*	*9*	*2*	*2*	*3*	*2*	0	1	2	*1*

TABLE VII.

RESIDUALS OF H. A. 45, 46, AND H.

Magn.	H. A. 45.							H. A. 46,1.							W. Herschel.						
	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.
N B	*2*	*10*	*6*	*7*	3	4	*3*	4	17	2	*2*	*10*	*10*	*1*	11	8	14	9	0	4	7
4.5	*11*	*4*	*1*	*3*	5	14	0	..	15	9	..	*2*	..	8	18	10	5	9	13	*5*	8
5.0	*4*	*4*	3	2	*1*	*3*	*1*	15	10	2	6	*7*	*18*	*2*	*5*	7	7	10	8	23	10
5.5	2	1	*1*	*1*	0	*3*	0	18	14	5	0	*9*	*16*	3	*2*	4	4	1	1	1	2
6.0	7	1	8	2	1	5	3	..	13	10	*6*	*10*	..	2	*16*	*14*	*1*	*6*	*4*	*6*	*7*
6.5	0	0	1	2	1	*4*	0	..	0	..	..	..	..	0	*13*	*16*	*10*	*9*	*5*	*18*	*12*
All	0	*2*	1	0	1	1	0	12	13	6	0	*8*	*15*	2	3	0	4	3	2	3	2
S B	4	*5*	..	1	3	8	2	3	13	8	3	*1*	*9*	1	4	0	20	7	*13*	22	4
4.5	*5*	*12*	*8*	*6*	5	9	*1*	13	14	3	1	1	*4*	5	8	16	*4*	*6*	18	19	12
5.0	*4*	*4*	*5*	*3*	2	7	*1*	14	11	8	8	1	*5*	6	1	1	8	15	11	4	6
5.5	*4*	*5*	*1*	4	*1*	2	*1*	12	11	8	2	*1*	*4*	4	*7*	*3*	*6*	2	4	*5*	*3*
6.0	*10*	*5*	*2*	*1*	3	4	*1*	16	11	6	7	0	*5*	5	26	*6*	*12*	*6*	*8*	*5*	*6*
6.5	*9*	*7*	*6*	*1*	*1*	4	*3*	12	10	10	4	*6*	*5*	4	*21*	*12*	*5*	*14*	0	5	*7*
All	*5*	*6*	*4*	*1*	2	5	*1*	12	11	7	5	*1*	*6*	4	2	*1*	*2*	*1*	2	9	1
P B	*3*	3	1	2	2	2	1	7	5	4	*2*	0	*24*	0	17	14	10	*2*	6	*11*	7
4.5	*6*	*2*	*1*	*5*	*2*	11	*2*	9	10	8	6	*2*	*18*	5	*1*	10	0	8	4	12	5
5.0	*5*	*3*	*1*	*1*	2	3	*1*	2	9	*1*	0	*6*	*8*	0	10	3	9	*6*	*2*	8	4
5.5	0	*1*	1	*4*	2	2	0	7	8	0	0	*7*	*14*	*1*	*4*	*2*	*12*	2	*10*	3	*4*
6.0	*8*	0	*2*	*1*	0	8	0	11	9	4	5	*6*	0	4	*22*	*13*	*3*	*2*	0	*6*	6
6.5	*8*	*1*	2	*1*	*1*	2	0	3	5	1	4	*1*	*12*	1	..	*11*	*22*	*24*	*13*	*14*	*16*
All	*5*	*1*	0	*2*	1	4	0	7	8	3	2	*4*	*12*	1	4	1	*3*	*4*	*2*	1	*1*
M B	*1*	*3*	*6*	4	2	16	2	4	2	6	*3*	*5*	*11*	*2*	14	20	9	6	15	*13*	11
4.5	*5*	5	*2*	2	7	9	2	8	11	8	1	1	*2*	5	11	19	4	7	3	18	10
5.0	*1*	*3*	0	3	3	7	1	10	8	3	*3*	*3*	*1*	2	*1*	6	*3*	*3*	2	*10*	*1*
5.5	*1*	*1*	1	0	5	4	1	6	6	5	3	*5*	*10*	1	*15*	*4*	*4*	*3*	*2*	*6*	*6*
6.0	*4*	*5*	*2*	0	3	4	*1*	2	9	8	1	*4*	*7*	2	*13*	*19*	*15*	*7*	*8*	14	*11*
6.5	*7*	*4*	*4*	1	4	4	*1*	0	6	7	*2*	*7*	*6*	0	14	*8*	*42*	*30*	*16*	..	*22*
All	*3*	*2*	*2*	2	4	6	1	5	7	6	0	*4*	*6*	1	1	3	*6*	*4*	2	0	0
A B	0	*4*	*4*	0	3	10	1	4	8	6	*1*	*3*	*12*	0	12	10	12	5	3	4	7
4.5	*6*	*2*	*2*	*2*	4	10	0	10	12	7	2	0	*4*	5	7	13	3	6	9	12	9
5.0	*4*	*3*	0	0	2	4	*1*	10	9	4	2	*3*	*6*	3	5	4	6	2	4	10	5
5.5	*1*	*2*	0	0	2	1	0	9	9	5	2	*4*	*9*	2	*7*	*1*	*4*	1	*2*	*1*	*2*
6.0	*6*	*2*	0	0	2	5	0	8	10	7	3	*4*	*5*	3	*9*	*13*	*7*	*5*	*4*	*3*	*7*
6.5	*6*	*3*	*2*	0	1	2	*1*	5	7	7	2	*5*	*6*	2	*7*	*12*	*21*	*18*	*7*	*8*	*13*
All	*3*	*3*	*1*	0	2	4	0	8	9	6	2	*3*	*7*	2	3	1	*1*	*1*	1	3	1

TABLE VIII.

RESIDUALS OF h, O, AND P.

Magn.	J. Herschel.							Uran. Oxon.							Potsdam.						
	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.
N B	6	*5*	5	*4*	*10*	*13*	*5*	*1*	*8*	*2*	*9*	*3*	*7*	*5*	26	22	18	16	6	0	15
4.5	14	*19*	6	24	*4*	..	*1*	*13*	10	2	12	*4*	*2*	4	27	21	24	17	3	*3*	14
5.0	..	*17*	*6*	..	*3*	..	*9*	4	10	2	*1*	*3*	7	3	34	25	20	12	5	*4*	13
5.5	0	..	..	..	..	..	0	12	7	4	11	11	8	9	27	30	18	12	2	*5*	13
6.0	..	..	..	..	*7*	..	*7*	12	2	11	2	8	3	5	30	35	25	16	4	*7*	15
6.5	..	..	..	..	..	..	..	*2*	*12*	*12*	*4*	3	0	*6*	38	30	26	15	4	*8*	14
All	7	*10*	4	2	*8*	*13*	*4*	4	2	3	2	3	3	3	28	28	22	15	4	*5*	14
S B	*9*	*2*	8	*8*	2	2	*1*	*10*	*9*	3	*3*	*17*	*28*	*12*	14	34	30	10	17	7	19
4.5	*2*	*6*	0	*12*	0	11	*2*	*9*	*5*	6	*6*	4	*11*	*3*	13	24	6	7	4	10	10
5.0	*22*	*18*	2	*4*	0	28	*3*	20	18	6	*50*	8	13	10	24	23	10	..	7	4	13
5.5	*17*	*35*	*16*	*12*	0	*16*	*14*	1	4	8	11	11	5	7	30	23	22	20	*5*	*8*	14
6.0	13	*23*	13	*22*	*25*	3	*14*	14	9	11	11	5	*25*	8	28	33	25	22	2	*6*	17
6.5	..	..	*78*	*80*	..	..	*79*	..	4	4	5	*18*	*2*	*3*	25	33	20	13	2	*8*	13
All	*9*	*13*	*5*	*12*	*1*	10	*6*	1	4	7	3	0	*7*	2	22	29	19	15	5	*3*	15
P B	3	11	*2*	7	2	2	5	0	5	*3*	0	*2*	*10*	*1*	23	20	12	15	4	8	14
4.5	9	*6*	8	*3*	30	7	7	10	13	7	25	11	*2*	10	22	22	16	2	*2*	*16*	8
5.0	*27*	*12*	..	*9*	42	12	*4*	11	12	4	9	7	9	9	21	27	12	9	*1*	*13*	9
5.5	0	*57*	*1*	*50*	*11*	..	*28*	12	8	14	12	12	*5*	11	25	25	15	6	*1*	*15*	8
6.0	*60*	*3*	10	..	*36*	..	*1*	6	4	3	5	3	*10*	2	32	31	20	7	*2*	*12*	11
6.5	..	..	..	..	..	..	..	*10*	*1*	*9*	*8*	*8*	*1*	*6*	38	32	23	7	*1*	*13*	12
All	3	*9*	4	*2*	6	6	0	7	7	4	7	5	0	5	26	27	17	8	*1*	*12*	10
M B	6	5	8	4	14	11	8	16	11	9	4	6	12	9	26	20	16	18	4	*3*	13
4.5	2	12	6	20	10	18	11	17	20	32	*3*	15	14	17	26	18	21	4	1	*12*	11
5.0	3	1	*2*	4	12	7	5	10	6	22	5	11	*4*	8	22	23	14	6	*2*	*6*	11
5.5	*20*	*14*	*31*	0	2	*60*	*15*	3	11	9	*1*	10	11	8	26	27	19	3	*2*	*13*	11
6.0	*16*	*29*	*39*	..	*12*	..	*21*	4	1	7	2	6	15	5	29	33	20	10	1	*8*	16
6.5	*31*	..	*76*	..	..	..	*54*	5	*20*	0	*27*	*18*	*6*	*13*	39	33	20	21	*1*	*10*	17
All	*4*	*2*	*10*	7	8	8	1	9	5	14	1	6	8	7	28	26	19	10	0	*9*	13
A B	1	2	5	1	2	1	2	0	0	1	*3*	*3*	*9*	*2*	23	23	17	15	7	1	15
4.5	3	*5*	5	3	9	14	4	7	11	13	8	6	*1*	8	22	21	19	10	1	*9*	11
5.0	*14*	*11*	0	*3*	11	17	*1*	12	11	7	3	4	6	7	23	25	16	9	2	*7*	11
5.5	*15*	*33*	*21*	*10*	*2*	*38*	*17*	7	8	9	9	11	7	9	27	27	18	9	*1*	*10*	11
6.0	*19*	*23*	*5*	*22*	*21*	3	*18*	7	4	8	5	6	*1*	5	30	33	22	13	1	*9*	14
6.5	*31*	..	*77*	*80*	..	..	*66*	*2*	*9*	*5*	*4*	*10*	*2*	*7*	37	32	23	14	1	*10*	14
All	*3*	*8*	*4*	*3*	2	6	*2*	6	4	6	3	3	1	4	26	27	19	12	2	*8*	13

TABLE IX.

RESIDUALS OF W, M, AND B.

Magn.	Williams.							H. A, 46,2. Table II.							Bailey.						
	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.
N B	..	..	..	..	..	..	..	28	7	3	6	*6*	*11*	2	9	8	11	13	*4*	*7*	5
4.5	..	..	..	..	..	..	..	..	19	10	12	*3*	..	12	10	2	5	7	2	0	4
5.0	..	..	..	..	..	..	..	7	15	12	*7*	*12*	*15*	7	8	7	9	7	*3*	4	5
5.5	..	..	..	..	..	..	..	16	22	11	1	*8*	*13*	13	*1*	5	6	1	2	2	3
6.0	..	..	..	..	..	..	..	27	18	4	8	*15*	..	13	*17*	0	0	*1*	0	2	0
6.5	..	..	..	..	..	..	..	..	19	5	..	0	..	13	22	*4*	*4*	*4*	*4*	*25*	*6*
All	..	..	..	..	..	..	..	19	19	9	4	*6*	*14*	10	6	3	4	3	*1*	*2*	2
S B	*14*	10	*6*	19	*1*	*7*	*1*	15	9	..	..	..	..	11	*2*	3	4	*13*	*6*	*4*	*3*
4.5	4	*18*	*12*	*27*	3	0	*7*	18	*4*	..	..	..	..	10	*3*	3	*4*	0	2	*2*	*1*
5.0	*24*	*23*	*22*	*17*	4	11	*11*	20	6	3	3	*3*	..	7	*5*	*2*	*3*	*7*	4	4	*1*
5.5	*21*	*23*	*21*	*34*	1	*4*	*16*	12	11	*12*	..	*8*	*8*	6	*2*	1	0	2	1	3	1
6.0	*7*	*39*	*41*	*61*	*21*	*46*	*36*	7	6	5	*14*	*10*	..	3	4	*2*	1	*6*	*5*	*6*	*3*
6.5	*65*	*61*	*44*	*44*	*41*	*39*	*48*	..	*7*	..	..	..	..	*7*	*18*	*7*	*5*	*4*	*12*	3	*6*
All	*18*	*28*	*29*	*28*	*7*	*11*	*19*	15	7	0	*6*	*7*	*8*	6	*3*	*1*	*1*	*4*	*2*	*1*	*2*
P B	*23*	12	*30*	0	*4*	..	*5*	12	14	4	1	*10*	3	5	4	7	1	*6*	*2*	*7*	0
4.5	3	*63*	6	20	1	..	*9*	5	10	10	..	*4*	*34*	2	*3*	5	*4*	2	3	*3*	1
5.0	*5*	*19*	2	6	18	18	3	16	8	2	2	*6*	*17*	7	*4*	4	0	1	1	0	0
5.5	*27*	*25*	*4*	13	10	*34*	*11*	15	10	*3*	5	*11*	*21*	4	*2*	*1*	*1*	*2*	0	*3*	*1*
6.0	*18*	*26*	*6*	*14*	6	*19*	*12*	..	9	3	*8*	*13*	*33*	2	*3*	*4*	*4*	*6*	*2*	*6*	*4*
6.5	*27*	*61*	*50*	*36*	*32*	*40*	*42*	..	6	..	..	0	*26*	*4*	3	*3*	*7*	*16*	*9*	*14*	*8*
All	*14*	*30*	*14*	*4*	0	*19*	*13*	14	9	3	1	*8*	*21*	4	*2*	1	*2*	*4*	*1*	*4*	*2*
M B	*4*	2	6	*9*	10	3	2	*6*	..	..	*9*	8	..	*2*	5	6	*4*	*2*	*3*	*10*	*1*
4.5	13	8	17	9	30	22	17	15	1	8	0	..	..	10	6	4	5	*3*	*2*	*7*	1
5.0	*2*	3	5	17	19	27	12	16	13	18	*3*	31	..	15	2	3	1	0	0	*2*	1
5.5	*17*	*4*	0	*2*	4	74	2	12	8	9	2	*16*	..	6	*4*	3	2	*1*	0	*7*	*1*
6.0	*31*	*30*	*36*	*20*	2	16	*20*	17	16	..	..	*17*	..	11	*4*	*3*	*2*	*4*	*3*	*8*	*4*
6.5	*61*	*61*	*55*	*50*	*6*	*34*	*48*	..	6	..	..	..	..	6	*2*	*16*	*9*	*11*	*9*	*20*	*11*
All	*15*	*14*	*14*	*5*	11	17	*4*	14	11	12	*2*	*4*	..	9	1	0	0	*3*	*2*	*4*	*2*
A B	*9*	7	*2*	*1*	3	*1*	0	12	10	3	1	*4*	*4*	4	4	6	2	*1*	*3*	*7*	0
4.5	9	*14*	3	*1*	13	12	4	13	10	10	6	*4*	*34*	7	1	4	1	0	1	*4*	1
5.0	*9*	*12*	*4*	1	13	19	2	16	10	9	*1*	1	*16*	9	*1*	3	2	1	0	2	1
5.5	*20*	*14*	*9*	*11*	4	10	*7*	14	13	3	3	*11*	*16*	7	*2*	2	2	0	1	*1*	0
6.0	*25*	*33*	*32*	*24*	*6*	*16*	*23*	17	12	4	*5*	*14*	*33*	7	*3*	*2*	*1*	*4*	*3*	*4*	*3*
6.5	*56*	*61*	*50*	*43*	*27*	*38*	*47*	..	12	5	..	0	*26*	7	*3*	*7*	*6*	*8*	*8*	*10*	*7*
All	*16*	*22*	*19*	*12*	2	0	*11*	15	12	6	1	*7*	*18*	7	0	1	0	*2*	*2*	*3*	*1*

TABLE X.

RESIDUALS OF D. C. AND C. P. D. NUMBERS.

Magn.	D. C.							C. P. D.							Numbers.						
	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.
N B	26	27	56	79	135	164	82	50	..	80	..	186	280	156	15	32	10	13	33	9	112
4.5	16	10	36	61	104	134	55	50	15	..	..	245	..	81	3	21	9	7	21	5	66
5.0	8	9	29	51	81	125	55	38	*10*	..	60	161	190	87	7	38	28	21	48	26	168
5.5	*1*	0	22	44	67	90	39	12	61	80	82	150	165	93	13	96	34	27	90	26	286
6.0	*16*	*4*	19	32	53	70	30	..	54	84	96	145	..	95	3	203	61	59	165	41	532
6.5	*22*	*15*	4	14	25	30	8	40	58	81	57	98	50	69	3	135	68	80	175	28	489
All	6	4	24	43	74	102	43	34	45	82	73	151	170	91	44	525	210	207	532	135	1653
S B	28	33	74	95	124	165	91	30	28	52	101	163	213	116	18	19	6	12	38	12	105
4.5	6	26	39	66	101	120	62	*26*	3	47	50	160	181	76	15	18	9	10	41	13	106
5.0	7	10	34	31	70	102	42	*40*	6	86	74	136	159	74	15	38	23	16	41	17	150
5.5	*5*	3	15	33	58	64	25	*24*	28	71	98	123	144	79	27	72	53	23	111	30	316
6.0	*7*	*12*	*6*	19	27	51	11	24	31	30	51	96	122	61	11	121	80	65	174	32	483
6.5	*32*	*29*	8	3	12	*13*	*6*	*5*	18	32	56	90	96	52	11	113	82	72	189	40	507
All	5	2	18	39	68	85	36	*6*	19	49	68	124	150	73	97	381	253	198	594	144	1667
P B	28	33	52	78	121	212	78	31	94	70	160	197	275	153	32	20	9	20	40	7	128
4.5	9	12	28	61	86	128	49	*5*	12	43	31	162	160	58	29	32	16	11	32	6	126
5.0	3	12	42	54	84	102	47	*3*	24	78	142	176	188	98	45	54	24	28	56	23	230
5.5	*19*	2	23	44	62	61	30	*9*	36	65	116	150	178	88	43	166	47	27	94	29	406
6.0	*24*	*14*	5	19	34	51	11	56	41	72	94	124	150	86	26	269	95	66	181	35	672
6.5	*30*	*26*	*9*	*4*	11	53	*4*	37	42	59	87	104	102	71	22	246	100	72	205	47	692
All	*4*	3	21	37	66	93	34	19	37	65	107	149	171	89	197	787	291	224	608	147	2254
M B	36	29	58	79	121	162	78	68	116	142	161	229	300	169	68	27	18	19	59	22	213
4.5	14	17	27	62	99	123	55	26	56	112	106	210	235	120	56	23	12	19	36	15	161
5.0	8	14	42	54	85	89	46	40	56	109	146	199	224	133	97	62	25	29	94	21	328
5.5	*13*	2	15	48	62	82	32	33	55	102	140	174	195	116	87	208	52	50	123	32	552
6.0	*18*	*14*	7	18	37	29	8	35	59	90	115	151	170	102	106	366	109	87	242	56	966
6.5	*36*	*27*	*6*	*15*	12	47	*10*	50	50	80	89	126	142	90	69	379	122	98	242	57	967
All	*1*	3	21	38	71	96	34	42	64	103	124	181	208	120	483	1065	338	302	796	203	3187
A B	29	30	57	82	126	174	82	50	78	107	144	197	258	148	133	98	43	64	170	50	558
4.5	11	14	32	62	97	126	54	4	28	70	64	183	202	89	103	94	46	47	130	39	459
5.0	6	11	36	52	80	109	49	10	25	91	111	167	192	101	164	192	100	94	239	87	876
5.5	*10*	1	20	44	63	77	32	8	42	79	111	148	172	95	170	542	186	127	418	117	1560
6.0	*19*	*10*	8	23	40	55	17	37	44	63	85	124	144	82	146	959	345	277	762	164	2653
6.5	*31*	*23*	*1*	1	16	27	*2*	31	38	58	72	104	111	70	105	873	372	322	811	172	2655
All	1	3	22	40	70	95	37	23	40	73	95	150	176	94	821	2758	1092	931	2530	629	8761

α Bootis, was taken on February 5, 1894, with an exposure of 49^m. The seventh spectrum, Class Ma, α Orionis, was taken on January 1, 1894, with an exposure of 60^m. In preparing Plate 1, original negatives were enlarged directly, without using a moving plate or a cylindrical lens. The amount of enlargement for α Carinae is 1.28 times, for all the other stars it is 1.60.

The principal results in Tables V to X are shown graphically in Plate 2, where ordinates represent magnitudes, on a scale of 5.0 cm. = 1 magn. One of the small squares, therefore, represents a tenth of a magnitude. In Figures 1, 3, and 5, the six classes of spectra are indicated at the top of the figure, and the corresponding catalogues on the left. Thus, it appears from the first six figures in the last line of Table V, that the mean residuals of H. A. 14, corresponding to spectra of Classes B, A, F, G, K, and M, are −.02, −.01, .00, .00, .00, and .00, respectively. Figures 2, 4, and 6, in like manner, show the effects of magnitude. Abscissas represent magnitudes on two fifths of the scale, or 2 cm. = 1 magn. One square, therefore, represents a quarter of a magnitude. The abscissas are taken from the first columns of Tables V to X, and the ordinates from the first six of the last seven lines of the last column of each portion of the Tables. The mean residuals corresponding to magnitudes B, 4.5, 5.0, 5.5, 6.0, and 6.5, are .00, −.01, .00, .00, −.01, and −.01, respectively.

Although all the photometric catalogues should be on the same scale, and several of the other catalogues have been reduced to this scale, the variations due to color are not necessarily eliminated. Owing to the number of stars, on which each measure depends, if an observer always sees a red star too bright, this will appear in the final result. In several cases, an error dependent on magnitude is appreciable in stars of the same color. This is partly due to the error mentioned on page 91, especially when the difference in scale is large. Other causes must enter, since some catalogues are affected much more than others.

We are now prepared to discuss the errors of each of the catalogues, separately.

14. The errors in H. A. 14 are small, both in the individual means and in the final results. The stars south of the Milky Way show small negative residuals having a mean value of 0.02 magn. In general, the deviations appear to be accidental rather than systematic. This is very satisfactory, as an additional observer took part in the work, and a different instrument was used. It seems probable, therefore, that the scale adopted

is the true one, since it is the same for both instruments. The average value of the thirty-six residuals in the last section of the second to the seventh columns of Table V, corresponding to A B, 4.5, 5.0, 5.5, 6.0, and 6.5, is ± 0.029, or less than a thirtieth of a magnitude. These residuals, small as they are, still show minute systematic errors. The upper left hand, and lower right hand, residuals in each square tend to positive values, and the lower right hand and upper left hand residuals, to negative. This may also be expressed by saying that bright, blue stars are relatively faint, and faint, red stars are relatively bright. It is also expressed by saying that, in the small meridian photometer, the scale is more compressed for the blue stars and more open for the red stars than in the large photometer.

23. The scale in H. A. **23** seems to be the same as in the other catalogues, as shown in the last column. There is, however, a distinct deviation due to color or spectrum, the red stars appearing fainter, relatively to the blue stars, since they give residuals which are larger algebraically. In nearly all cases, stars of Classes B and A give negative residuals, those of Classes K and M, positive residuals. This effect is much more marked in stars south of the Milky Way than in those north of it. In the latter, it is in fact insensible. A probable explanation is thus suggested. In H. A. **50**, 10, it is shown that two catalogues of stars are included in H. A. **23**. The first of these contains the one hundred standard stars on which all the magnitudes depend, and which are generally included between declinations +60° and +75°. The second catalogue contains stars, in declinations −30° to −45°, which were used to determine the atmospheric absorption south of the zenith. Accordingly, they have been grouped separately. The results are given in Table XI in nearly the same form as Table V. The northern stars are given in the first part of the Table, the southern in the second part.

The mean of the twenty-nine residuals in the first part of Table XI is ± 0.016. The large residual, 48, which appears in Tables III, V, and XI, is due to H. R. 8405, and depends only on that star.

It will be seen that the systematic errors are absent in the northern stars, but the effect due to color is strongly marked in the southern stars, as is also shown in Plate 1, Fig. 7. The blue stars are brighter, relatively, than the red stars. This is the opposite from what might have been expected if the cause was the selective absorption of the atmosphere. Since the Sun and Moon look red when near the horizon, we should expect that red stars would be less affected, and thus appear brighter relatively than blue stars.

TABLE XI.

H. A. 23, NORTH AND SOUTH.

Magn.	North.							South.						
	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.
B	*1*	*4*	*2*	*2*	0	0	*1*	*14*	*10*	. .	3	3	6	*3*
4.5	*3*	*1*	*2*	*2*	0	7	*1*	*11*	*2*	*15*	2	*2*	8	*3*
5.0	*4*	*2*	2	0	0	0	*1*	*6*	*8*	*12*	*4*	0	1	*4*
5.5	. .	0	*1*	. .	0	1	0	*16*	*12*	*9*	*5*	3	7	*5*
6.0	. .	1	0	3	0	*4*	0	*9*	*8*	*7*	*3*	*3*	2	*5*
6.5	. .	. .	. .	. .	*1*	4	2	*16*	*16*	*2*	. .	. .	48	*3*
All.	*2*	*1*	*1*	*1*	0	1	*1*	*11*	*9*	*8*	*3*	0	7	*4*

24,1. The systematic errors in H. A. 24,1 appear to be small. Stars south of the Milky Way are distinctly fainter than those north of it, the difference, however, is less than a tenth of a magnitude. As there are no stars in this catalogue, south of declination −20°, the effect of atmospheric absorption is small. The average value of the 36 residuals in the last section of Table V is ±0.037, which becomes less than ±0.03 if we allow for the constant difference of +0.02.

24,4. The systematic errors in H. A. 24,4 are also small and nearly insensible. The average deviation is ±0.023.

34. The conditions under which the catalogue, contained in H. A. 34, was made, are very different from those preceding it. The place of observation was in the southern hemisphere, the measures were made by another observer, and nearly all the stars were south of declination −24°. The bright stars and the red stars are slightly too bright according to the measures.

44. The systematic errors in H. A. 44 are small. Only two of the 245 residuals exceed a tenth of a magnitude. The blue stars are relatively bright, according to the measures, but the average value of the 36 residuals in the last section of Table VI is only ±0.019, and only one exceeds 0.05.

45. The systematic errors in H. A. 45 are small, but they confirm those in H. A. 44, as might be expected since the observations were made under the same conditions. The average deviation of the 36 residuals is ±0.026.

46. The observations in H. A. 46 were made under similar conditions to those in H. A. 34, and, therefore, we should expect similar systematic errors. The effect of color, red stars measuring too bright, is more marked in H. A. 46, but the effect of magnitude in the latter volume is insensible.

H. The correction for color, in the Catalogue of Sir William Herschel, is very small. This may also be expressed by saying that he was not color blind, but that his impression of the relative intensities of different colors was nearly the same as that of the observers here. The error due to the grouping, by which faint stars appear too bright, is well marked.

h. The curves derived from Sir John Herschel's observations are less smooth than in the preceding catalogue, partly because the number of stars is less. Red stars are observed, relatively, rather faint. As his observing list consisted mainly of bright stars, the faint stars included are generally those which he estimated too bright. The systematic errors for these stars are, therefore, large and negative. The residual *66*, for magnitude 6.5, is too large to be entered in Figure 4.

O. The Uranometria Oxoniensis is an important catalogue, and it furnishes a wholly independent test of the scale of the meridian photometer. The form of instrument, method of observation, location, and observers, all differed from those used here. Even the methods of comparison were unlike, disappearance of images being used in this work, and equality of images in that of the meridian photometer. The agreement in color is excellent, the extreme differences in the last line only amounting to a twentieth of a magnitude. The difference in scale is insensible for the four central groups, the stars in the two end groups appearing too bright, perhaps for other reasons than a real difference of scale.

P. A careful comparison of the Potsdam Catalogue is of the utmost importance. The observations were made with the greatest care, and are more numerous than those obtained anywhere else, except at Harvard. An elaborate discussion of them, and a comparison with the Harvard observations has been made at Potsdam. It is interesting to note that the fundamental facts are the same as those found here. The most important conclusions are a marked difference in magnitude, dependent on color or spectrum, and an equally marked agreement in scale. Both of these conclusions are confirmed in the four different portions of the sky. The minuteness of the accidental errors, both in the Potsdam and Harvard Catalogues, appears in Table XII, in which the systematic differences are in a great measure eliminated. The thirty-six residuals derived from all the regions, and contained in the last portion of Table VIII, are first corrected for the effect of class of spectrum. This is done, by subtracting the mean residuals in the last line. In Table XII, the magnitude is given in the first column, and the remainders, after making the subtraction just mentioned, are given in the next six columns. Thus, in the column headed B, we have 23 − 26 = *3*, 22 − 26 = *4*, 23 − 26 = *3*, etc. The means of the six residuals in each line are given in the eighth column. They show that a small systematic error, due to scale, still remains. The results of subtracting the residuals in the eighth column from those in the six preceding columns are given in the six following columns. Thus, in the first line *3* − 1 = *4*, *4* − 1 = *5*, *2* − 1 = *3*, etc.

TABLE XII.

CORRECTED POTSDAM RESIDUALS.

Magn.	First Correction.							Second Correction.					
	B	A	F	G	K	M	All.	B	A	F	G	K	M
A B	*3*	*4*	*2*	3	5	9	1	*4*	*5*	*3*	2	4	8
4.5	*4*	*6*	0	*2*	*1*	*1*	*2*	*2*	*4*	2	0	1	1
5.0	*3*	*2*	*3*	*3*	0	1	*2*	*1*	0	*1*	*1*	2	3
5.5	1	0	*1*	*3*	*3*	*2*	*1*	2	1	0	*2*	*2*	*1*
6.0	4	6	3	1	*1*	*1*	2	2	4	1	1	*3*	*3*
6.5	11	5	4	2	*1*	*2*	3	8	2	1	*1*	*4*	*5*

It will be noticed that the residuals are very small, even after the first correction. The average value is ±0.029, and only one exceeds a tenth of a magnitude. After the second correction, the average value is ±0.024, and only two exceed a twentieth of a magnitude. A small systematic error still remains, greater in amount, of the same kind as that in H. A. 14, pointed out on page 123, but with opposite sign. In each part of Table XII the right hand upper, and left hand lower, residuals are positive, and those in the other two corners are negative.

It appears from the above discussion that the Potsdam magnitude of any star may readily be reduced to the scale of the other catalogues when the class of spectrum is known. It is only necessary to subtract .26, .27, .19, .12, or .02, from the Potsdam magnitude when the spectrum is of Class

B, A, F, G, or K, and to add .08 when the spectrum is of Class M. The accidental errors of the Potsdam magnitudes are so small that this will often be a convenient method of deriving an independent value of the magnitude.

The relation of the Potsdam estimates of color to the class of spectrum will next be considered. In the Revised Harvard Photometry, the letters a, b, c, d, e, and f are used to designate the colors estimated at Potsdam, as white, yellowish white, whitish yellow, yellow, reddish yellow and yellowish red, respectively. In Table XIII, the region and magnitude are given in the first column. The next six columns correspond to the six classes of spectra given in the headings. The numbers of stars of each color, also indicated in the heading, are given in these columns. These numbers are the sum of the numbers in the twelve regions, 30° square, included in each of the four portions of the sky. Thus, of the bright stars whose spectra are of Class B there are 4 whose color was estimated at Potsdam as a, and 4, as b. The last six columns give a numerical value of the mean of the colors, on a scale in which a is assumed to be 0; b, 1; c, 2; d, 3; e, 4; f, 5. This differs from the numerical values derived at Potsdam, Publik. 17, XXXI, where the values 0, 1, 4, and 6 are given for the first four of these colors. Both sets of values are arbitrary, however.

The successive lines of the Table give the results for each magnitude for the four regions and for all combined, next the results for the four regions for all magnitudes combined, and finally the results for the entire work.

The accuracy with which the colors are estimated is shown in the last columns of Table XIII. It will be noticed that nearly all the figures for regions N and S are less than the results for All, and those for P and M are greater. The means for the four regions are −0.12, −0.06, +0.08 and +0.05. It would appear, therefore, that the stars in or near the Milky Way are slightly redder than those outside of it. As, however, the difference is only about one sixth of the interval between white and yellowish white, for example, it may well be due to some form of systematic error as yet unrecognized. The corresponding difference in light would be about a hundredth of a magnitude.

The effect of magnitude is less marked than might be expected. Stars of Class G show a distinct maximum, that is a tendency to red, for magnitude 5.5. Stars of Class K are from a half to a whole unit redder than stars of Class G. The bright stars of Classes K and M are distinctly

TABLE XIII.

POTSDAM COLORS.

Region.	B	A	F	G	K	M	B	A	F	G	K	M
	a b c	a b c d	a b c d	a b c d e	a b c d e f	c d e						
N B	4, 4,..	12, 12,..,..	2, 6, 1,..	., 6, 5,..,..	., 1, 9, 13,..,.	.., 5, 2	0.50	0.50	0.89	1.45	2.52	3.29
4.5	.., 1,..	4, 12,..,..	.., 4, 1, 1	1, 3, 3,..,..	., 1, 7, 7, 1,.	1, 4,..	1.00	0.75	1.50	1.29	2.50	2.80
5.0	1, 1,..	10, 21, 1,..	2, 17, 7,..	1, 5, 7, 5,..	., 3, 13, 13,..,.	1, 15, 4	0.50	0.72	1.19	1.89	2.34	3.15
5.5	5, 3,..	25, 50,..,..	1, 20, 6,..	., 4, 9, 4,..	., 3, 38, 26, 1,.	3, 18, 3	0.38	0.67	1.19	2.00	2.37	3.00
6.0	.., 3,..	61, 87, 7,..	2, 33, 7,..	., 15, 24, 2,..	., 5, 56, 60, 5,.	6, 22, 8	1.00	0.65	1.12	1.68	2.52	3.06
6.5	1, 1,..	31, 69, 6,..	3, 42, 7,..	1, 20, 30, 4,..	1,15, 73, 44, 2,.	5, 17, 1	0,50	0.76	1.08	1.71	2.23	2.83
S B	3, 5,..	1, 4,..,..	.., 1, ..,..	., 2, 1, 1,..	., 1, 4, 1,..,.	.., 1,..	0.62	0.80	1.00	1.75	2.00	3.00
4.5	3, 3,..	1, 1,..,..	.., 3, ..,..	., 1, 2,..,..	., 3, 8, 4, 2,.	.., 1,..	0,50	0.50	1.00	1.67	2.29	3.00
5.0	2, 2, 1	2, 6,..,..	.., 3, 1,..	., .., ..,..,..	., 1, 4, 6,..,.	.., 2, 1	0.80	0.75	1.25	...	2.45	3.33
5.5	2, 10,..	5, 17, 2,..	.., 12, 3,..	., 2, 1,..,..	., 2, 8, 8,..,.	.., 6,..	0.83	0.88	1.20	1.33	2.33	3.00
6.0	2, 2,..	10, 38, 1,..	.., 18, 4,..	., 4, 8, 1,..	., 2, 19, 21,..,.	.., 8,..	0.50	0.82	1.18	1.77	2.45	3.00
6.5	.., 1,..	2, 21, 1,..	.., 10, 4,..	., 9, 5, 4,..	., 7, 17, 17,..,.	.., 10, 1	1.00	0.96	1.29	1.72	2.24	3.09
P B	4, 9, 1	4, 6, 1,..	1, 5, ..,..	., 5, 7,..,..	.,.., 6, 15,..,.	.., 1, 1	0.79	0.73	0.83	1.58	2.71	3.50
4.5	1, 11, 1	4, 19,..,..	.., 5, 2,..	., 1, 1, 1,..	., 1, 3, 11, 1,.	.., 3, 2	1.00	0.83	1.29	2.00	2.75	3.40
5.0	4, 18, 3	4, 28, 1,..	.., 10, 7, 1	., 4, 9, 3,..	.,.., 9, 18, 7,.	.., 6, 3	0.96	0.91	1.50	1.94	2.94	3.33
5.5	5, 16, 2	15, 92, 3,..	1, 15, 12,..	., 5, 7, 3, 2	., 1, 22, 32, 3,.	.., 12, 5	0.87	0.89	1.39	2.12	2.64	3.29
6.0	4, 6,..	38, 120,10, 1	2, 28, 24, 1	., 8, 19, 9,..	., 1, 39, 45,10,.	2, 16,..	0.60	0.85	1.44	2.03	2.67	2.89
6.5	2, 3,..	32, 109, 8, 1	2, 26, 17, 2	1, 13, 20, 9,..	., 4, 53, 60, 6,.	3, 24, 3	0.60	0.85	1.40	1.86	2.55	3.00
M B	4, 6,..	3, 8,..,..	.., 4, 1,..	., 4, 5, 2,..	.,.., 5, 12, 5,.	.., 2, 3	0.60	0.73	1.20	1.82	3.00	3.60
4.5	6, 9,..	2, 8, 2,..	.., 5, 1,..	., 1, 4, 2,..	.,.., 4, 9, 4,.	.., .., 3	0.60	1.00	1.17	2.14	3.00	4.00
5.0	18, 15, 1	2, 23, 4,..	2, 8, 3, 1	1, 3, 2, 4, 1	.,.., 9, 26, 6,.	.., .., 2	0.50	1.07	1.21	2.09	2.93	4.00
5.5	7, 14, 1	30, 56,11, 2	1, 17, 6,..	., 1, 6, 5,..	.,.., 14, 29, 2,.	.., 7, 3	0.73	0.85	1.21	2.33	2.73	3.30
6.0	9, 7, 1	65, 97,11, 2	1, 17, 20, 1	1, 6, 17, 3,..	., 6, 36, 38, 8,.	..,211, 2	0.53	0.71	1.54	1.81	2.55	3.00
6.5	8, 7, 1	63, 103, 8, 4	5, 27, 11, 5	2, 9, 23, 6,..	., 4, 40, 49, 8,1	.., 20, 3	0.56	0.74	1.33	1.82	2.63	3.13
All. B	15, 24, 1	20, 30, 1,..	3, 16, 2,..	., 17, 18, 3,..	., 2, 24, 41, 5,.	.., 9, 6	0.65	0.63	0.95	1.63	2.68	3.40
4.5	10, 24, 1	11, 40, 2,..	.., 17, 4, 1	1, 6, 10, 3,..	., 5, 22, 31, 8,.	1, 8, 5	0.74	0.83	1.27	1.75	2.64	3.29
5.0	25, 36, 5	18, 78, 6,..	4, 38, 18, 2	2, 12, 18,12, 1	., 4, 35, 63,13,.	1, 23,10	0.70	0.88	1.29	1.96	2.74	3.26
5.5	19, 43, 3	75, 215,16, 2	3, 64, 27,..	., 12, 23,12, 2	., 6, 82, 95, 6,.	3, 43,11	0.75	0.82	1.26	2.08	2.53	3.14
6.0	15, 18, 1	174, 342,29, 3	5, 96, 55, 2	1, 33, 68,15,..	.,14,150,164,23,.	10, 57,10	0.59	0.75	1.34	1.83	2.56	3.00
6.5	11, 12, 1	128, 302,23, 5	10,105, 39, 7	4, 51, 78,23, 1	1,30,183,170,16,1	8, 71, 8	0.58	0.79	1.27	1.78	2.43	3.00
N All.	11, 13,..	143, 251,14,..	10,122, 29, 1	3, 53, 78,15, 1	1,28,196,163, 9,.	16, 81,18	0.54	0.68	1.13	1.72	2.38	3.02
S “	12, 23, 1	21, 87, 4,..	.., 47, 12,..	., 18, 17, 6,..	.,16, 60, 57, 2,.	.., 28, 2	0.69	0.85	1.20	1.71	2.33	3.07
P “	20, 63, 7	97, 374,23, 2	6, 89, 62, 4	1, 36, 63,25, 2	., 7,132,181,27,.	5, 62,14	0.87	0.86	1.40	1.93	2.65	3.07
M “	52, 58, 4	165, 295,36, 8	9, 78, 42, 7	4, 24, 57,22, 1	.,10,108,163,33,1	2, 40,16	0.58	0.78	1.35	1.93	2.70	3.20
All. “	95,157,12	426,1007,77,10	25,336,145,12	8,131,215,68, 4	1,61,496,564,71,1	23,211,50	0.69	0.78	1.28	1.83	2.54	3.10

redder than the faint stars of the same classes. These differences are probably largely psychological, and we must obtain measures of the intensity of different portions of the photographic spectrum before we can determine with certainty the laws for the stars themselves.

Only one star, H. R. 4478, whose spectrum falls in Class K was estimated at Potsdam as color a. An examination of Plate B 13741, taken at Arequipa with the 8-inch Bache Telescope, on June 12, 1895, with an exposure of 60^m, confirms the spectrum, G 5, given in H. A. 50, 107. A second star, H. R. 2190, whose spectrum also falls in Class K was estimated at Potsdam as color f. An examination of Plate I 33721, taken at Cambridge with the 8-inch Draper Telescope on November 30, 1905, with an exposure of 73^m, confirms the spectrum, K, given in H. A. 50, 61.

W. The catalogue of Mr. Stanley Williams consists of stars south of declination −30°, and, accordingly, it does not contain any stars in the region north of the Milky Way. Each star was compared directly with certain others selected from the Harvard Photometry, H. A. 14, and an attempt was made, by Mr. Williams, to reduce the observations to the scale of that work. He also made a comparison of his final magnitudes with those in the Southern Harvard Photometry, H. A. 34. This comparison indicated a difference in scale in these two photometric catalogues, which is not confirmed by the much more complete comparison given in Table VI. Table IX shows that there are large variations in W, due both to color and magnitude, blue stars and faint stars appearing relatively bright. The large residuals for groups 6.0 and 6.5, especially the latter, are probably due to the method of selecting and grouping the stars.

M. The catalogue designated by M is given in H. A. 46, Table II, and consists of measures of moderately bright stars, which were made too late to be included in the adopted magnitudes of the Revised Harvard Photometry. The scale appears to be the same as that of the other meridian photometer catalogues, except that stars are measured on the average 0.07 magn. fainter. There is, however, a marked difference dependent on color, blue stars measuring bright.

B. The catalogue designated as B, or Bailey's Uranometry, was derived from comparisons of each star with one that was slightly brighter and another that was slightly fainter, and estimating the intervals in tenths of a magnitude. The systematic errors are nearly insensible, although red stars and faint stars measure relatively rather bright.

D.C. The residuals in the column headed D relate to the Draper Catalogue for stars contained in that work, and which are generally north of declination −19°. For other stars, south of −19°, the residuals are taken from the Cape Photographic Durchmusterung. Stars common to both catalogues are given in H. A. 50, Table V.

The magnitudes in the Draper Catalogue give the brightness of the rays of wave length 430. As this is a measure of the amount of blue light, red stars measure very faint, and this furnishes an excellent determination of the color of the stars. The residuals are corrected in Table XIV in the same way that the Potsdam residuals are corrected in Table XII. The magnitudes are given in the first column, and the next seven columns give the residuals in Table X, for the six classes of spectra and for all, corrected by the mean values given in the last line of that Table. The last of these columns, applied as a correction to the preceding six, corrects for scale and gives the residuals contained in the last six columns of Table XIV.

TABLE XIV.

CORRECTED DRAPER CATALOGUE RESIDUALS.

Magn.	B	A	F	G	K	M	All.	B	A	F	G	K	M
B	28	27	35	42	56	79	45	*17*	*18*	*10*	*3*	11	34
4.5	10	11	10	22	27	31	17	*7*	*6*	*7*	5	10	14
5.0	5	8	14	12	10	14	12	*7*	*4*	2	0	*2*	2
5.5	*11*	*2*	*2*	4	*7*	*18*	*5*	*6*	3	3	9	*2*	*13*
6.0	*20*	*13*	*14*	*17*	*30*	*40*	*20*	0	7	6	3	*10*	*20*
6.5	*32*	*26*	*23*	*39*	*54*	*68*	*39*	7	13	16	0	*15*	*29*

The corrected residuals in Table XIV show systematic errors like those in Table XII, but larger in amount. These may be due to the method of grouping.

An important inference may be drawn from the lines "All" in Table X. The residuals for each class of spectrum are nearly the same in the five lines. The greatest difference in the last two lines, in which the stars in the Milky Way are compared with those in the entire sky, is only 0.03 magn. All five residuals for Class A are small, as we should expect since an attempt was made to base the magnitudes in the Draper Catalogue on the photometric magnitudes of these stars. If the colors of stars in the Milky Way differed from those of other stars having the same class of spectrum, we should expect that a difference would show itself in the residuals. In the last two lines, however, the difference in the residuals of Classes K and A in the Milky Way is .68, and in all the sky, .67. The corresponding differences for Class M are .93 and .92. It must be remembered that any difference which may appear, in such cases, will include the systematic errors in the photographic magnitudes, and cannot be distinguished from them. This result, in connection with that found from the Potsdam magnitudes, indicates that the variations in color of stars in different parts of the sky, having the same class of spectrum, is insensible.

C. P. D. The magnitudes in the Cape Photographic Durchmusterung are derived from the diameters of the photographic images, and accordingly represent the intensity of the entire photographic light. Since red stars photograph faint, the residuals from them are large and positive. The corrected residuals are given in Table XV, in the same form as Tables XII and XIV.

TABLE XV.

CORRECTED CAPE DURCHMUSTERUNG RESIDUALS.

Magn.	B	A	F	G	K	M	All.	B	A	F	G	K	M
B	27	38	34	49	47	82	54	*27*	*16*	*20*	*5*	*7*	28
4.5	*19*	*12*	*3*	*31*	33	26	*5*	*14*	*7*	2	*26*	38	31
5.0	*13*	*15*	18	16	17	16	7	*20*	*22*	11	9	10	9
5.5	*15*	2	6	16	*2*	*4*	1	*16*	1	5	15	*3*	*5*
6.0	14	4	*10*	*10*	*26*	*32*	*12*	26	16	2	2	*14*	*20*
6.5	8	*2*	*15*	*23*	*46*	*65*	*24*	32	22	9	1	*22*	*41*

The systematic errors which remain have the same form as the corrected Potsdam and Draper residuals. It might be expected that the sign of these errors would be different in the Potsdam from the other two catalogues, since in it the blue stars are faint, while in the Draper and Cape Catalogues, blue stars are bright.

The deviations in the residuals for stars in different regions are probably due to errors in scale. The differences for stars having different spectra, but in the same part of the sky, agree fairly well. Thus, the difference for Classes K and A in the Milky Way is 1.17, and for all the stars, 1.10. The corresponding differences for Class M are 1.44 and 1.36. One reason why these differences are greater than in the case of the Draper Catalogue is that the spectra of red stars are shorter than those of blue stars. The Draper magnitudes relate to a single wave-length, while the Cape magnitudes are based upon the entire light. There appears to be no evidence that stars of a given class of spectrum differ in color in different parts of the sky.

The systematic errors in H. A. **23** are so well marked, for the southern stars, that it is important to make a similar comparison for the other photometric catalogues. The residuals south of declination −30°, for the stars in H. A. **14**, **23**, **44** and **45**, have accordingly been grouped in the first part of Table XVI. The number of the volume is given in the first column, and the means of the residuals of the stars in region E, for each class of spectrum and for all, are given in the next seven columns. The second part of the Table gives similar results for all the stars in the catalogues, **34**, **46**, M, and B. The designations of the catalogues are followed by the residuals for each class of spectrum, and for all.

TABLE XVI.

EFFECT OF COLOR.

Cat.	B	A	F	G	K	M	All.	Cat.	B	A	F	G	K	M	All.
14	*9*	*6*	6	9	*3*	*2*	4	**34**	2	2	*1*	*3*	*5*	*9*	*2*
23	*11*	*9*	*8*	*3*	0	7	*4*	**46**	8	9	6	2	*3*	*7*	2
44	*2*	*8*	*3*	0	5	7	0	M	15	2	6	1	*7*	*18*	7
45	*6*	*9*	*3*	2	7	10	0	B	0	1	0	*2*	*2*	*3*	1

It appears from the first part of Table XVI that, for stars near the southern horizon, the effect of color is similar in all four catalogues, blue stars appearing bright. In the second part of the Table an opposite effect is shown, the blue stars measuring faint in the first three catalogues. The amount of the change in **34**, **46**, and M, is nearly proportional to 1, 2, and 3, respectively. All the stars in these catalogues are included, so that this effect cannot be due to atmospheric absorption. As all the observations in these catalogues were made by Professor Bailey, we might infer that his estimates of color were different from those of the observers of the other catalogues, but the observations in Catalogue B, which do not show any effect of color, were also made by him. The difference in color of the stars λ Ursae Minoris and σ Octantis, with which the comparisons with the meridian photometer were made, cannot be the cause, since in 34 and 46 the second star was used, and in M, the first. Finally, the Purkinje phenomenon would affect the scale rather than the class of spectrum. The further consideration of this matter may be postponed until the observations made with the Meridian Photometer, to determine the atmospheric absorption, are discussed. Many thousands of measures have been made for this purpose, and a comparison of the observations of the same stars, at upper and lower culmination, will prove of especial value.

It is also difficult to account for the different systematic errors dependent on magnitude, in catalogues H, h, W, and B. All were reduced in substantially the same way, and in all the faint stars give negative residuals, probably due to the grouping, but the amount of the change differs greatly. The arithmetical sums of the six residuals in the last part of each Table furnish a rough means of comparison. They equal 43, 70, 83, and 12, for catalogues H, h, W, and B, respectively.

A count of the number of stars of various classes is given on page 113 of Table III, and in the last portion of Table X. Before discussing this material, it will be best to make a more detailed classification according to spectrum, to see if the laws are the same for all which are united in the same group. Accordingly, Table XVII gives the numbers of stars having the class of spectrum indicated in the headings, and in the regions and of the various magnitudes indicated in the first column. The twelve regions, 30° square, are here united in a single group. A few scattering classes of spectra have been included in some of the groups. Thus, all subdivisions of Class O are included in O; B 4, B 6, and B 7, are included in B 5; A 1 in A; A 4 in A 5; F 7 in F 8; G 8 in K; K 8 in Ma; Ma 5, Mb 5, Mc, and Md, in Mb. Stars of Class N are not included in Table III. The number of stars in Tables X and XVII are not exactly the same, owing mainly to double stars.

An examination of Table XVII fails to suggest any modification of the grouping of the spectra already adopted in Table III. When the differences in the spectra are slight, they sometimes cannot be detected in the fainter stars. This may account for the larger number of bright stars of classes B 1, B 2, and K 2.

TABLE XVII.

DETAILED CLASSIFICATION OF SPECTRA.

Magn.	B							A				F				G				K			M			
	O	B	B1	B2	B3	B5	B8	B9	A	A2	A3	A5	A8	F	F2	F5	F8	G	G2	G5	K	K2	K5	Ma	Mb	N
N B	..	2	..	2	4	4	3	..	23	9	..	3	..	6	1	4	5	4	..	5	26	2	5	3	1	..
4.5	..	..	..	..	2	..	1	1	11	6	3	2	..	7	..	1	2	4	..	4	15	2	5	..	..	..
5.0	..	..	..	..	4	1	2	3	18	13	4	11	..	17	..	5	3	9	4	6	41	1	6	15	5	..
5.5	..	..	..	..	2	2	9	4	69	16	7	7	..	25	2	3	5	14	5	19	70	1	10	11	5	1
6.0	..	2	..	..	1	..	..	3	188	9	3	8	..	46	7	15	4	32	8	30	135	..	12	15	14	..
6.5	..	1	..	..	..	1	1	..	130	3	2	6	1	48	13	25	13	35	7	34	140	2	14	8	6	1
S B	..	..	..	2	1	5	10	1	11	4	3	3	..	2	1	5	1	6	..	7	29	2	4	5	3	..
4.5	..	..	1	..	1	10	3	3	11	4	..	5	..	3	1	5	3	2	..	11	26	4	4	6	3	..
5.0	..	..	..	..	5	4	6	4	19	12	3	6	1	16	..	8	4	4	..	3	38	..	8	5	4	..
5.5	..	..	..	..	3	13	11	6	50	10	6	14	3	27	9	7	3	11	2	12	97	2	10	12	8	2
6.0	..	..	..	..	1	2	8	1	101	16	3	15	8	46	11	12	9	33	11	38	136	..	17	12	3	1
6.5	..	1	..	..	..	1	9	1	97	13	2	21	5	46	11	22	9	35	7	32	157	..	20	13	7	..
P B	1	8	4	4	8	5	3	..	13	7	..	6	1	2	..	6	7	7	..	4	32	5	2	4	..	..
4.5	..	3	1	7	12	3	3	3	19	8	2	9	1	6	..	5	2	4	..	5	23	3	2	4	..	..
5.0	1	2	2	4	19	5	12	5	27	17	4	10	..	14	1	12	5	7	4	10	46	..	9	10	4	..
5.5	1	2	1	3	17	4	15	9	141	12	4	10	2	31	4	6	4	15	2	21	73	..	11	13	5	..
6.0	1	5	1	2	8	6	3	4	245	14	6	17	5	66	7	13	9	39	5	34	145	2	15	14	6	2
6.5	..	4	1	1	6	4	6	2	220	23	2	19	6	61	14	13	8	46	5	38	165	11	17	26	4	..
M B	3	2	8	11	26	11	7	3	16	6	2	5	..	10	3	10	2	7	..	7	44	8	17	3	2	..
4.5	2	1	4	5	20	17	7	4	10	5	4	4	..	8	..	9	3	7	..	8	26	2	9	2	4	..
5.0	5	7	3	7	43	18	14	3	35	18	6	8	3	13	1	11	5	11	2	19	74	1	13	6	2	..
5.5	4	9	3	5	29	24	13	13	165	25	4	15	..	28	9	13	10	19	8	12	110	2	15	12	5	..
6.0	2	22	4	5	35	11	27	7	319	31	9	26	5	61	17	15	13	46	13	35	206	1	24	27	5	2
6.5	4	18	1	3	9	13	21	2	350	21	4	28	8	73	16	15	13	60	10	38	204	..	15	26	13	2
All. B	4	12	12	19	39	25	23	4	63	26	5	17	1	20	5	25	15	24	..	23	131	17	28	15	6	..
4.5	2	4	6	12	35	30	14	11	51	23	9	20	1	24	1	20	10	17	..	28	90	11	20	12	7	..
5.0	6	9	5	11	71	28	34	15	99	60	17	35	4	60	2	36	17	31	10	38	199	2	36	36	15	..
5.5	5	11	4	8	51	43	48	32	425	63	21	46	5	111	24	29	22	59	17	64	350	5	46	48	23	3
6.0	3	29	5	7	45	19	38	15	853	70	21	66	18	219	42	55	35	150	37	137	622	3	68	68	28	5
6.5	4	24	2	4	15	19	37	5	797	60	10	74	20	228	54	75	43	176	29	142	666	3	66	73	30	3
N All.	..	5	..	2	13	8	16	11	439	56	19	37	1	149	23	53	32	98	24	98	427	8	52	52	31	2
S “	..	1	1	2	11	35	47	16	289	59	17	64	17	140	33	59	29	91	20	103	483	8	63	53	28	3
P “	4	24	10	21	70	27	42	23	665	81	18	71	15	180	26	55	35	118	16	112	484	11	56	71	19	2
M “	20	59	23	36	162	94	89	32	895	106	29	86	16	193	46	73	46	150	33	119	664	14	93	76	31	4
All. “	24	89	34	61	256	164	194	82	2288	302	83	258	49	662	128	240	142	457	93	432	2058	41	264	252	109	11

There are so many stars brighter than the magnitude 4.25, grouped under the designation B, that it seemed best to subdivide them. This has been done in Table XVIII. The stars are divided into five groups, those whose magnitudes are brighter than 2.24; those included between 2.25 and 2.74; those between 2.75 and 3.24; those between 3.25 and 3.74; those between 3.75 and 4.24. The numbers in the four portions of the sky, and of all combined, are given in the successive lines of the Table, as indicated in the first column. The six sections correspond to the six classes of spectra subdivided into the five groups according to magnitude as indicated in the headings.

TABLE XVIII.

NUMBERS OF BRIGHT STARS.

Region.	B	A	F	G	K	M
	B 2.5 3.0 3.5 4.0	B 2.5 3.0 3.5 4.0	B 2.0 2.5 3.0 3.5	B 2.0 2.5 3.0 3.5	B 2.0 2.5 3.0 3.5	B 2.0 2.5 3.0 3.5
N	3, 2, 2,.., 8	3, 5, 4,10,10	1,.., 2, 2, 5	..,.., 3, 2, 8	2,.., 7,11,13	1, 1, 1, 3, 3
S	3,.., 2, 2,11	2, 2, 1, 7, 7	.., 1, 2, 1, 2	..,.., 4, 2, 6	2, 1, 2, 9,24	1, 1, 3, 1, 6
P	6, 1, 7, 6,12	1, 3, 2, 3,11	.., 2, 2, 3, 2	1, 1, 3, 5,10	2, 2, 3,14,19	3, 2, 1, 1,..
M	6, 6,17,19,20	6,.., 3, 5,13	3, 1, 2, 4, 8	5, 1, 2, 3, 8	2, 3, 9,10,35	2, 1, 4, 7, 8
All	18, 9,28,27,51	12,10,10,25,41	4, 4, 8,10,17	6, 2,12,12,32	8, 6,21,44,91	7, 5, 9,12,17

We are now prepared to consider a most important question, the distribution of the stars according to magnitude and spectrum. The theoretical law, if the stars are distributed according to chance, as shown in H. A. **14**, 481, H. A. **48**, 150, and elsewhere, is $\log N = aM + b$, in which N represents the total number of stars brighter than the magnitude M, while a and b are constants of which the first should equal 0.60, and the second have a value dependent on the region included, and the density of the stars in it. The term density is here used to indicate the number of stars per square degree, and not its relation to specific gravity. The value of a in the discussions mentioned above is 0.51 or 0.52, and is still less for fainter stars. Two hypotheses have been proposed to account for this difference. First, that there is an absorbing medium in space, which would render the distant stars still fainter, and secondly, that the bright stars form a cluster, the Sun being at, or near, its centre. The last part of Table X furnishes the means of determining whether the same law governs stars in different portions of the sky, and those having different spectra. Thus, we see that, in the region north of the Milky Way, there are 32 stars, whose spectrum is of Class A, which are brighter than the magnitude 4.25, and 525 which are brighter than the magnitude 6.50. As the lower limit of the last group, is somewhat uncertain, it will be omitted, and the two groups which contain 32 stars brighter than 4.25, and 390 brighter than 6.25, will be employed to determine approximate values of *a*. Subtracting the logarithm of 32 from that of 390 we have 2.591 − 1.505 = 1.08,6 which corresponds to 6.25 − 4.25 = 2.00 magnitudes. The value of *a* is accordingly 0.54. Table XIX gives the results of a similar computation for other regions and spectra. The region is given in the first column and the values of *a* for the six classes of spectra and for all combined are given in the next seven columns. The residuals, after subtracting the theoretical value, 0.60, are given in the last seven columns.

TABLE XIX.

EFFECT OF POSITION AND SPECTRUM

Region.	Values of *a*.							Residuals from 0.60.						
	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.
N	.22	.54	.58	.49	.52	.54	.51	*.38*	*.06*	*.02*	*.11*	*.08*	*.06*	*.09*
S	.34	.57	.73	.51	.51	.47	.52	*.26*	*.03*	.13	*.09*	*.09*	*.13*	*.08*
P	.37	.72	.66	.44	.50	.58	.54	*.23*	.12	.06	*.16*	*.10*	*.02*	*.06*
M	.39	.70	.54	.52	.49	.41	.51	*.21*	.10	*.06*	*.08*	*.11*	*.19*	*.08*
All.	.39	.64	.61	.49	.52	.48	.52	*.21*	.04	.01	*.11*	*.08*	*.12*	*.08*

The most striking feature of Table XIX is the small value of *a* for stars of Class B. This may also be stated by saying that the number of faint stars of this class is relatively very small compared with the bright stars. In fact, in Table X the number of these stars does not increase in successive groups. The total number of magnitude B is 133, while of magnitude 6.5 it is only 105. In the case of the stars of Class A, the increase is from 98 to 873. A small part only of this effect in the case of Class B may be due to the difficulty of distinguishing between Classes A and B when the spectra are faint. The next point of interest is that the value of *a*, for Classes A and F, is actually greater than the theoretical value, 0.60, while it is less for each of the Classes, G, K, and M. The result 0.52, for all the stars, is the same as that found in H. A. 14 and 48.

The results for the different portions of the sky do not show any well-marked difference. The individual discordances in some of the groups are probably due to the small number of stars. Thus, the group of stars brighter than 4.25, used in determining the value .73, for Class F in region S, contains only 6 stars.

Table XIX furnishes a means of deciding which regions and classes of spectra should be selected in studying the distribution of the stars. Obviously, the law for stars of Class B is unlike that of the other stars, and it will also be of interest to determine the law for all the stars in the sky. The results for these two cases are accordingly given in Table XX. The limiting magnitude of each group is given in the first column. Thus, the first group contains all stars brighter than the magnitude 2.25. The number of stars in each successive group is given in the second column. There are 18 stars of Class B, brighter than magnitude 2.25, 9 between 2.25 and 2.74, etc. These numbers are taken from Table XVIII for the brighter stars, and from the last part of Table X for the fainter stars. The third column gives the successive sums of the numbers in the second column, and equals the total number brighter than the magnitude in the first column. Thus, the total number brighter than 4.25 is 133 as is also given in Table X. The fourth column gives the logarithms of the numbers in the third column. Since the groups correspond to half a magnitude, the first differences, which are given in the fifth column, should equal .300, if the theoretical law were correct. The last difference should equal one half this amount, since the limit for the last group has been assumed to be 6.50. In forming the Revised Harvard Photometry, all stars were included whose magnitude was 6.50, or brighter, in either of the meridian photometer catalogues. Some stars were thus included which were fainter than the magnitude 6.50, since although brighter in one catalogue they were fainter in others. Some stars, however, were probably omitted in forming the working lists, although actually brighter than the magnitude 6.50. An attempt was next made to represent the logarithms in the fourth column by the formula, $\log N = aM + b$, in which a is equal to its theoretical value 0.60, and such a value of b is assumed as will satisfy the fifth group in the Table. This group is selected since the first four groups contain so few stars that an accurate value of b cannot be derived from them. The adopted formula for all the stars of Class B then becomes $\log N = 0.60M - 0.426$. The sixth column gives the observed values of $\log N$ minus those computed by this formula. As it may be easier to estimate these differences in magnitudes, rather than in logarithms, the residuals in the sixth column are converted into magnitudes in the seventh column, by dividing by 0.4. The eighth column gives the residuals from the empirical formula, log $N = 0.42\ M + 0.339$. The second portion of the Table gives the corresponding values for all the stars, first using the formula, log $N = 0.60\,M + 0.197$, and secondly, the formula, $0.51\,M + 0.600$. The Sun has been included among the stars brighter than magnitude 2.25, making the total number of these stars 56, instead of 55 as indicated in the last line of Table XVIII. The first four lines relate to stars brighter than the magnitude 3.75, and are derived from the last line of Table XVIII. The other six lines are based upon the count given in the last portion of Table X.

TABLE XX.

ORION STARS AND ALL STARS.

Magn.	B	*N*	log *N*	Δ	O – C	.60	.42	All.	*N*	log *N*	Δ	O – C	.60	.51
2.25	18	18	1.255	.176	+.331	.83	*.07*	56	56	1.748	.216	+.201	.50	.00
2.75	9	27	1.431	.309	+.207	.52	*.16*	36	92	1.964	.291	+.117	.29	*.10*
3.25	28	55	1.740	.174	+.216	.54	.09	88	180	2.255	.236	+.108	.27	.00
3.75	27	82	1.914	.210	+.090	.22	.00	130	310	2.491	.256	+.044	.11	*.05*
4.25	51	133	2.124	.249	.000	.00	.00	249	559	2.747	.261	.000	.00	*.05*
4.75	103	236	2.373	.228	–.051	*.13*	.10	459	1018	3.008	.269	–.039	*.10*	*.04*
5.25	164	399	2.601	.155	–.123	*.31*	.14	876	1894	3.277	.261	–.070	*.18*	.00
5.75	170	570	2.756	.099	–.268	*.67*	.00	1560	3454	3.538	.248	–.109	*.27*	.01
6.25	146	716	2.855	.059	–.469	*.117*	*.27*	2653	6107	3.786	.157	–.161	*.40*	.00
6.50	105	820	2.914	. .	–.560	*.140*	*.39*	2655	8762	3.943	. .	–.154	*.38*	.07

The first grouping made was that contained in the last lines of Table XXI. It was noticed that the law of distribution of stars of Classes A and F appears to be alike, and the same is true, of Classes G, K, and M. The Milky Way is evidently a disturbing factor in the distribution of the stars. Accordingly, the regions outside of it, N and S, were combined. Owing to the small number of bright stars, those brighter than magnitude 4.25 were included in a single group, as in Table III. The results were so striking that they were at once published in Table I of H. C. 147, which is substantially the same as the last part of Table XXI. The principal difference is that the two components of a double star, whose combined light was measured, but whose spectra were classified separately in H. A. 50, are, for uniformity, included in Table XXI. The form is the same as Table XX. The two formulas used for stars of Classes A and F are $\log N = 0.60\,M - 0.753$, and $\log N = 0.59\,M - 0.696$. The formulas in the second part of the Table for stars of Classes G, K, and M, are $\log N = 0.60\,M - 0.482$, and $\log N = 0.51\,M - 0.094$.

TABLE XXI.

REGION OUTSIDE OF THE MILKY WAY.

Magn.	AF	N	log N	Δ	O-C	.60	.59	GKM	N	log N	Δ	O-C′	.60	.51
2.25	6	6	0.778	.368	+.181	.45	.36	6	6	0.778	.176	−.090	*.22*	*.69*
2.75	8	14	1.146	.216	+.249	.62	.55	3	9	0.954	.508	−.214	*.54*	*.89*
3.25	9	23	1.362	.271	+.165	.41	.35	20	29	1.462	.294	−.006	*.02*	*.26*
3.75	20	43	1.633	.193	+.136	.34	.29	28	57	1.756	.312	−.012	*.03*	*.16*
4.25	24	67	1.826	.267	+.029	.07	.04	60	117	2.068	.262	.000	.00	*.02*
4.75	57	124	2.093	.307	−.004	*.01*	*.04*	97	214	2.330	.255	−.038	*.10*	.00
5.25	127	251	2.400	.304	+.003	.01	.00	171	385	2.585	.255	−.083	*.21*	.00
5.75	255	506	2.704	.283	+.007	.02	.02	307	692	2.840	.249	−.128	*.32*	.00
6.25	465	971	2.987	.149	−.010	*.02*	*.01*	536	1228	3.089	.169	−.179	*.45*	*.01*
6.50	398	1369	3.136	. .	−.011	*.03*	*.01*	584	1812	3.258	. .	−.160	*.40*	.09

Table XXII has the same form as Tables XX and XXI. The first portion relates to the stars of Classes A and F, in all parts of the sky. The two empirical formulas are $\log N = 0.60\,M - 0.401$, and $\log N = 0.63\,M - 0.537$. The second portion of Table XXII relates to the stars of Classes G, K, and M, in all parts of the sky. The two formulas are $\log N = 0.60\,M - 0.095$, and $\log N = 0.50\,M + 0.330$.

The results shown in Tables XX, XXI, and XXII, may now be compared. It appears from the first part of Table XX, that the relation of M to $\log N$ is not linear for stars of Class B. The value of a is always much less than 0.60, and perhaps becomes zero for faint stars. This would indicate that there are no faint stars of Class B. The peculiar grouping of these stars in certain portions of the sky is shown in H. A. 56, No. 2.

The second portion of Table XX shows that, for the brighter stars as a whole, the value of a is nearly 0.51. The average value of the ten residuals in the last column of the Table is ± 0.032. The numbers of stars are slightly

TABLE XXII.

ENTIRE SKY.

Magn.	AF	*N*	log *N*	*Δ*	O-C	.60	.63	GKM	*N*	log *N*	*Δ*	O-C	.60	.50
2.25	16	16	1.204	.273	+.255	.64	.81	22	22	1.342	.202	+.087	.22	*.28*
2.75	14	30	1.477	.204	+.228	.57	.70	13	35	1.544	.342	−.011	*.03*	*.40*
3.25	18	48	1.681	.238	+.132	.33	.43	42	77	1.886	.275	+.031	.08	*.17*
3.75	35	83	1.919	.230	+.070	.18	.24	68	145	2.161	.294	+.006	.02	*.11*
4.25	58	141	2.149	.300	.000	.00	.02	140	285	2.455	.245	.000	.00	.00
4.75	140	281	2.449	.309	.000	.00	*.02*	216	501	2.700	.270	−.055	*.14*	*.01*
5.25	292	573	2.758	.356	+.009	.02	*.03*	432	933	2.970	.233	−.085	*.21*	.04
5.75	728	1301	3.114	.302	+.065	.16	.07	662	1595	3.203	.244	−.152	*.38*	.00
6.25	1304	2605	3.416	.169	+.067	.17	.04	1203	2798	3.447	.166	−.208	*.52*	*.02*
6.50	1245	3850	3.585	..	+.086	.22	.07	1305	4103	3.613	..	−.192	*.48*	.08

less than those given in H. A. **48**, 168. This is mainly due to the double stars which are not included in this discussion when the magnitudes or spectra relate to the combined light of the components.

The last lines of Table XXI show in a striking manner that the stars of Classes A and F, from the fourth to the sixth magnitudes, are distributed according to the theoretical law, in which $a = 0.60$. Also, that stars of Classes G, K, and M, follow a very different law, and that for them $a = 0.51$. This is also shown in Figure 8. Ordinates represent residuals from the theoretical law, $a = 0.60$, on a scale of 1 magn. = 10.0 cm., or two squares represent a tenth of a magnitude. Abscissas are on one fifth of this scale, or 1 magn. = 2.0 cm. The upper line represents Classes A and F, and is nearly horizontal. The inclined line is nearly straight, and represents Classes G, K, and M. The first four lines of the Table relate to the bright stars. They are so few in number, that but little weight should be given to them. They indicate, however, a very curious law. All the residuals for Classes A and F are large and positive, those for Classes G, K, and M, are negative. This is also shown by the differences, *Δ*,

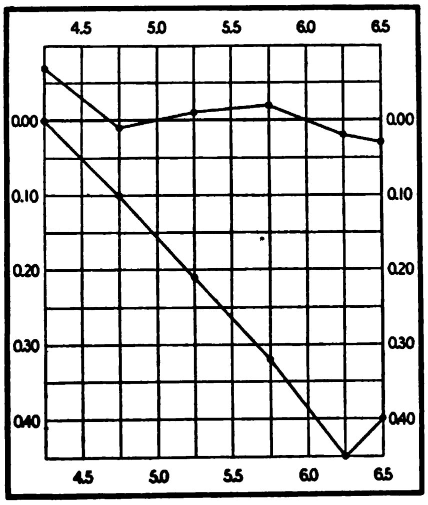

FIG. 8.

which are small in the fifth, and large in the twelfth column. This law may be expressed by saying that from the second to the fourth magnitude, the fainter stars of Classes A and F are less numerous, and those of Classes G, K, and M more numerous, than the value $a=0.60$ would require. When combined as in Table XX these differences neutralize each other and, as already stated, the value, $a=0.51$, closely represents all.

Table XXII shows that for the entire sky the number of faint stars of Classes A and F is so much increased by the Milky Way, that the value of a becomes 0.63. For classes G, K, and M this value is diminished to 0.50. Since all the bright stars are included in this investigation, it does not seem probable that the conclusions can be changed sensibly by additional measures. Of course, an extension of this investigation to the fainter stars becomes a matter of the greatest importance.

While the number of stars brighter than the magnitude 6.50 is somewhat uncertain, for reasons stated above, it is not probable that the relative numbers of stars of different classes, brighter than magnitude 6.25, and given in Tables III and X, will be materially changed. The absolute numbers may be somewhat increased by the addition of double stars in which both companions are bright.

The numbers of stars, of each class of spectrum, brighter than the magnitude 4.25, in each of the regions 30° square, are given in the first part of Table III, page 113. Table XXIII gives a similar count for stars brighter than the magnitude 6.25. It is compiled from page 113, omitting the group 6.5. The first three columns give the region, the galactic longitude and the galactic latitude of its centre, taken from the first three columns of Table II. The remaining columns give the numbers of stars, brighter than the magnitude 6.25, of each class of spectrum, and of all combined.

It appears from the last line of the first part of Table XXIII, that the total numbers of stars north and south of the Milky Way are almost exactly equal. The number of stars of Class B south of the Milky Way is more than double that north of it, owing to the accumulation of these stars in the constellations Orion and Argo. On the other hand, the stars of Class A are in excess in the northern regions. Accordingly, we cannot conclude that the Milky Way deviates from a great circle, or that the Sun is on one side, or the other, of its central plane.

If we pass three planes through the Sun, at right angles to each other, the number of stars in each of the hemispheres should be nearly equal,

TABLE XXIII.

NUMBERS OF STARS.

Reg.	Long.	Lat.	B	A	F	G	K	M	All.	Reg.	Long.	Lat.	B	A	F	G	K	M	All.
	°	°									°	°							
A 2	94	+43	1	30	12	10	33	11	97	C 1	97	−46	3	23	18	4	37	7	92
B 4	143	+47	1	32	24	14	31	6	108	2	133	−35	26	39	15	10	29	5	124
5	114	+71	..	27	13	3	31	9	83	12	57	−40	6	26	12	9	29	8	90
6	44	+61	3	39	15	8	33	11	109	D 1	110	−76	1	14	15	4	38	9	81
7	37	+46	6	38	6	15	25	14	104	2	165	−55	8	26	13	21	23	7	98
C 6	204	+64	3	28	7	14	18	9	79	11	2	−38	7	28	18	18	29	8	108
7	290	+76	1	33	8	12	28	10	92	12	24	−64	8	28	8	7	43	7	101
8	345	+55	..	30	12	10	35	11	98	E 1	248	−71	4	15	13	17	31	8	88
9	3	+29	7	47	13	8	31	11	117	2	217	−47	4	7	15	9	30	4	69
D 6	237	+40	3	28	7	10	24	7	79	8	323	−33	10	23	15	6	37	13	104
7	277	+46	4	22	15	14	26	4	85	9	316	−61	4	17	13	9	37	10	90
8	313	+35	12	36	10	9	42	4	113	F 1	256	−37	5	22	16	12	42	18	115
All	..	..	41	390	142	127	357	107	1164	All	..	..	86	268	171	126	405	104	1160
A 1	102	+18	12	44	17	5	26	10	114	B 2	123	− 4	30	64	19	17	30	2	162
3	75	+22	9	46	18	9	46	10	138	8	47	+ 6	29	74	22	16	55	9	205
B 1	97	−17	17	48	22	18	27	7	139	9	69	−13	20	61	13	8	44	4	150
3	138	+19	2	46	10	16	39	5	118	C 4	169	+11	9	75	10	16	44	15	169
C 3	154	−14	33	93	26	11	37	6	206	10	16	+ 3	13	57	24	11	39	6	150
5	182	+38	2	30	8	11	24	9	84	D 4	196	− 3	50	70	14	22	42	18	216
11	32	−22	9	40	13	14	28	6	110	10	349	−11	15	37	20	15	47	9	143
D 3	183	−29	36	57	20	10	33	8	164	E 3	222	−19	57	54	25	20	52	18	226
5	212	+22	7	34	12	15	38	6	112	4	237	+ 6	58	54	24	16	53	20	225
9	334	+14	12	34	17	13	25	5	106	6	291	+12	52	41	11	20	40	12	176
E5	263	+16	32	46	13	17	32	15	155	7	312	− 6	46	45	12	18	49	16	186
F 3	286	−32	4	23	15	13	48	13	116	F 2	267	−14	35	54	22	25	59	17	212
All	..	..	175	541	191	152	403	100	1562	All	..	..	414	686	216	204	554	146	2220

unless the Sun is eccentrically placed in the stellar system to which it belongs. A deviation from the centre can thus be determined approximately both in direction and amount. The planes selected are the equator, the equinoctial colure, and the solstitial colure.

The results of these three bisections are contained in Table XXIV. The letters in the first column, E., E.C., and S.C. represent the equator, equinoctial colure and solstitial colure, respectively. The next seven columns give the numbers of stars of the six classes of spectra and of all combined, in the northern hemisphere, in that having right ascensions from 0^h to 12^h, and in that having right ascensions from 6^h to 18^h. The next seven columns give the corresponding numbers for the alternate hemispheres. The last seven columns give the results found by subtracting the numbers in the second hemispheres, from those in the first.

TABLE XXIV.

DIVISION BY GREAT CIRCLES.

Cir.	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.
E.	242	1070	357	269	799	201	2938	474	815	363	340	920	256	3168	*232*	255	*6*	*71*	*121*	*55*	*230*
E.C.	404	981	379	318	824	228	3134	312	904	341	291	895	229	2972	92	77	38	27	*71*	*1*	238
S.C.	382	962	323	327	854	263	3111	334	923	397	282	865	194	2995	48	39	*74*	45	*11*	69	116

The conclusions to be derived from the grouping of the northern and southern stars are nearly the same as those found for stars north and south of the Milky Way. The stars of Class B are in excess in the southern, those of Class A in the northern, hemisphere. The stars of Classes B and A are also in excess in right ascensions 0^h to 12^h and 6^h to 18^h. The differences do not seem to be sufficiently marked to render it certain that they are not due to accident, owing to the comparatively small number of stars.

In order to determine the distribution of stars having different distances from the Milky Way, the stars in Table XXIII have been grouped according to their galactic latitudes. In Table XXV, forty-eight regions have been divided into eight groups, each containing six regions, and the mean galactic latitude is given in the first column. The next seven columns give the number of stars of each class of spectrum, and of all in the six regions combined. The following seven columns give the deviations from the mean, expressed in percentages. Thus, in the six regions having the largest northern latitude, the mean latitude is +62°.3. The total number of stars of Class A in this group is 189, and the average of all is 236. The first of these numbers is 0.80 of the second, or 20 per cent less. The sums and means of the numbers in the first eight lines, regardless of signs, are given in the last two lines.

The Milky Way appears to the eye as a broad band with moderately well defined boundaries. From Table XXV it seems probable that its effect extends over the entire sky. Even in Class A, to which the Milky Way is mainly due, the falling off in numbers, as the latitude increases

TABLE XXV.

GALACTIC LATITUDES.

Lat.	B	A	F	G	K	M	All.	B	A	F	G	K	M	All.
°														
+62.3	8	189	79	61	176	56	569	*91*	*20*	*12*	*20*	*18*	*2*	*25*
+41.3	28	184	58	69	174	49	562	*69*	*22*	*36*	*9*	*19*	*14*	*26*
+21.0	69	263	83	70	212	57	754	*23*	11	*8*	*8*	*1*	0	*1*
+ 9.2	206	323	96	99	266	77	1067	129	37	7	30	24	35	40
− 7.0	161	382	116	84	239	45	1027	79	62	29	11	11	*21*	35
−22.2	158	276	117	100	247	69	967	76	17	30	32	15	21	27
−38.2	57	161	94	59	203	59	633	*37*	*32*	4	*22*	*6*	4	*17*
−62.3	29	107	77	67	202	45	527	*68*	*55*	*14*	*12*	*6*	*21*	*31*
Sums	716	1885	720	609	1719	457	6106	572	256	140	144	100	118	202
Mean	90	236	90	76	215	57	763	72	32	18	18	12	15	25

numerically, shows itself in all except the first line. This would indicate that the Milky Way consisted of a layer of stars rather than a ring. In all the classes, the number of stars is greater when the latitude is small, or all are affected by the Milky Way. The numbers of stars in the fifth line is less than in the fourth or sixth, for Classes G, K, and M, perhaps owing to the division of the Milky Way into two branches. It will be noticed that the distribution in Class F resembles that in Classes G, K, and M, much more than it does that in Class A. This is the opposite effect from that found above for the distribution according to magnitude.

A summary will now be given of the principal results derived in the preceding investigation. The observations contained in the various meridian photometer catalogues, although extending over a period of twenty-seven years, and made with different instruments, by different observers, and in different places, agree closely as regards scale, the differences amounting to only a few hundredths of a magnitude. An independent confirmation of this agreement is also obtained from the Oxford and Potsdam Catalogues. The only catalogues showing marked deviations are those which are supposed to have been reduced to the scale of the meridian photometer, but in which the faint stars appear to be too bright, owing to the method of selecting the stars to be observed, and of grouping the results. It appears probable, therefore, that the scale of the meridian photometer agrees closely with the true photometric scale. The agreement as regards color is also good, for nearly all the catalogues. The principal deviation is that of the Potsdam observations, in which the blue stars measure about three tenths of a magnitude fainter than the red stars, as compared with the results given in the other catalogues. The accidental errors in these observations are so small, however, that they furnish an excellent measure of color, both from the estimates of color made at Potsdam, and from the residuals. If corrected by means of the color, or the spectrum, they furnish a very good independent determination of the magnitude. The correction for color, obtained with the meridian photometer, is confirmed by the observations at Oxford, and also by those of Sir William Herschel, and other observers. A comparison with the Draper Catalogue and the Cape Photographic Durchmusterung shows that when stars of different colors are compared, the difference between visual and photographic magnitudes may exceed a magnitude, this difference depending on the class of spectrum. As soon as we have accurate photographic magnitudes of the brighter stars, we shall be furnished with a precise measure of their colors. The Potsdam estimates of color show a remarkable agreement in the colors of all stars having the same class of spectrum, whether bright or faint, in or out of the Milky Way. This result is confirmed very satisfactorily by the Draper magnitudes. The differences in the Cape magnitudes are probably due to errors of scale. All three catalogues agree in showing that, for stars in the same part of the sky, those having the same spectrum have the same color, whatever their magnitude.

Perhaps the most important conclusion to be drawn from this investigation is that which relates to the distribution of stars of different classes of spectra. The theoretical value of the coefficient, a, which connects the logarithm of the number of stars with the magnitude, is 0.60. The observed value of this constant from all the bright stars is 0.51, from which the existence of an absorbing medium in space has been inferred. Grouping the stars according to their spectra, we find that for stars of Classes A and F, from the fourth to the sixth magnitude, the coefficient is very nearly 0.60. Great doubt is thus thrown on the existence of an absorbing medium. The coefficient for stars of Classes G, K, and M, is about 0.51, while for stars of Class B it is much smaller, 0.42, indicating that there are few faint stars of this class. Except in the case of Class B, there is no distinct evidence that there are more stars on one side of the Sun than on the other.

It is difficult to see how an absorbing medium could affect stars of one class and not those of another. For a given wave length the absorption must be the same for all, and there are no rays in stars of Class K not contained in Class A. A selective absorption would be detected as a well-marked dark band in very distant stars.

The effect of the Milky Way seems to extend over all parts of the sky, instead of being confined to a narrow band as it appears to the eye. Stars of Class F, unlike those of Classes B and A, are distributed nearly uniformly, like stars of Classes G, K, and M, independently of the Milky Way. In this respect, Class F resembles Classes G, K, and M, while as regards the distribution according to magnitude it resembles Class A.

PLATE II.

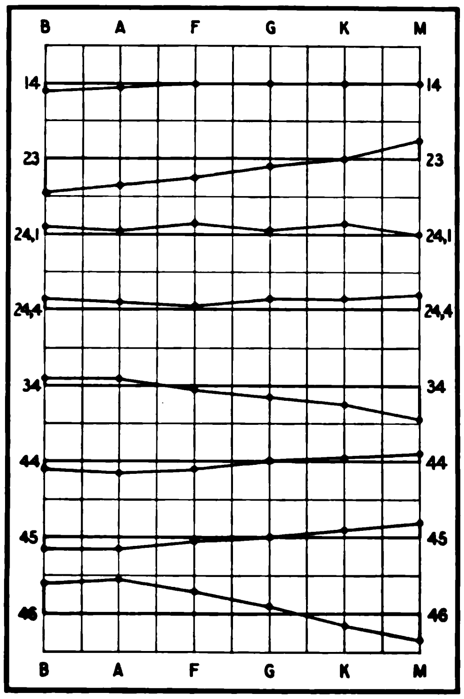

Fig. 1. Grouping of Meridian Photometer Catalogues according to spectrum.

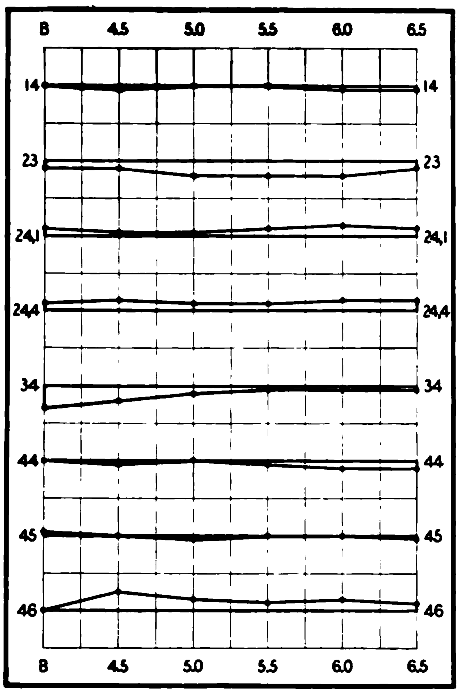

Fig. 2. Grouping of Meridian Photometer Catalogues according to magnitude.

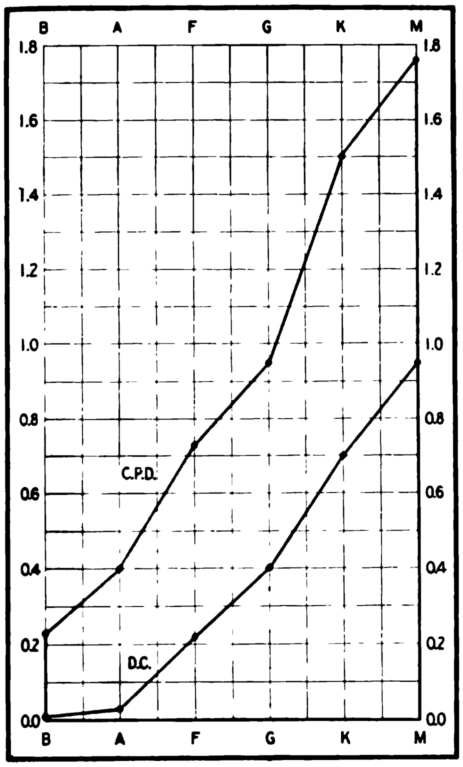

Fig. 5. Photographic Catalogues.

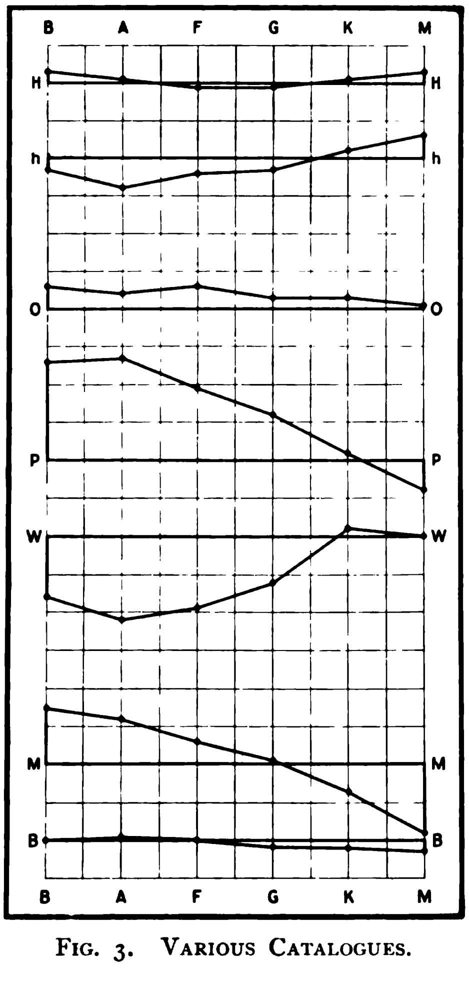

Fig. 3. Various Catalogues.

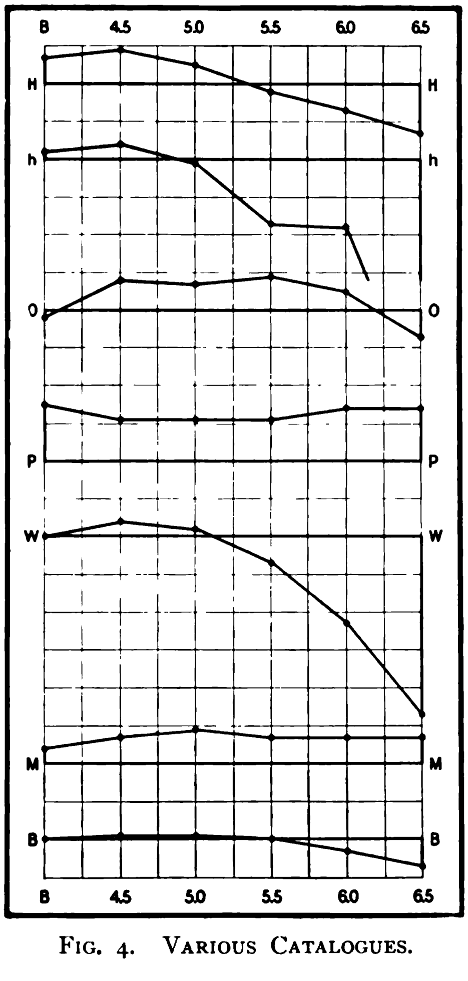

Fig. 4. Various Catalogues.

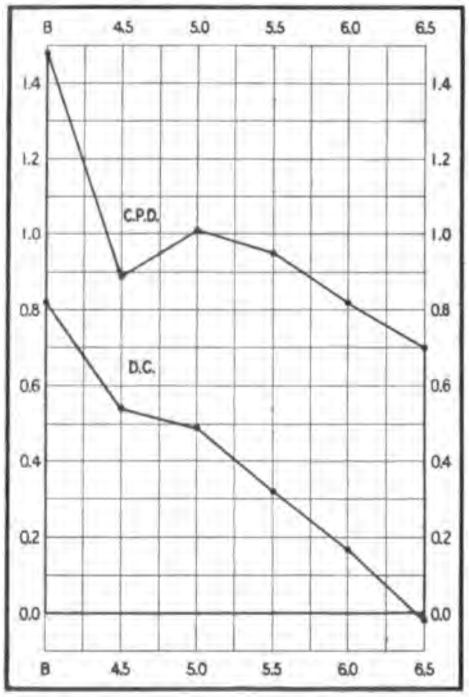

Fig. 6. Photographic Catalogues.

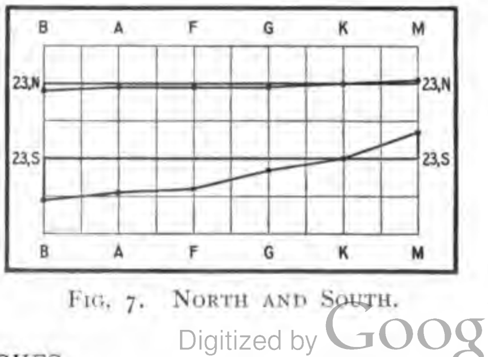

Fig. 7. North and South.

COMPARISON OF PHOTOMETRIC CATALOGUES.

OBSERVATIONS ON J. D. 3182 WITH THE 4-INCH MERIDIAN PHOTOMETER.

THE amount of material accumulated by means of the Meridian Photometer is so large that its publication in detail is entirely impracticable. If a line were assigned to the four settings from which each stellar magnitude was derived, the observations already obtained would fill about five thousand pages, or twenty volumes of the Annals of this Observatory. It seems worth while, however, to publish in this form the observations of a single evening, in order to permit a detailed study of the nature of the errors, to indicate the degree of accuracy attained, and to show what precautions were taken to avoid mistakes, or to detect them if their existence appeared probable from later observations.

The time required for a single observation was about a minute, but this time was increased indefinitely when there was any difficulty in identifying the stars with certainty. By long practice, a skilful observer and recorder frequently observed sixty or even more stars in an hour. This rate was attained, however, only after the greatest care had been taken to systematize the work in order that no time should be wasted, and that neither observer nor recorder should be idle for more than a few seconds at a time. Every precaution was taken to guard against a wrong identification, and to reduce the errors of observation as much as possible. The method of observation has been described in H.A. 14, 6, 23, 4, 44, 119, and 50, 2. In the earlier work, the observations of each star were recorded as ledgers on separate sheets of paper, but later it was found best to make the observations in journal form, recording successively all those on each night in books.

To permit a study in detail of the work, the observations of one series, that taken on December 19, 1894, J.D. 3182, are given in Table I. This series was chosen since it was the longest taken with the instrument, and it is important to know if the prolongation of the work affected its accuracy. The selection was not made until several days after the completion of the observations. Even the decision to continue the observations later than usual was not made until after two hundred of the stars had been observed. This series may, therefore, be regarded as fairly representing the work done at that time, as it would have been impossible for the observer or recorder, foreseeing a special study of their work, to have taken more than usual care.

In Table I, the sidereal time of observation is given in the first column, and the designation of the star, in the second. Stars taken from the Bonn Durchmusterung are indicated by their zone and number in that catalogue. Stars in the Argentine General Catalogue are indicated by the letter A followed by the number of the star in that catalogue. Stars in the Harvard Photometry are indicated by the letter H followed by the number of the star in that catalogue. The one hundred circumpolar standards are designated by the Harvard Photometry number preceded by the letters S.u., when observed at upper culmination, and by the letters S.l. when observed at lower culmination. Other stars observed at lower culmination are indicated by the Harvard Photometry number preceded by the letter l. The four photometric readings are given in the third column, the reading of the declination circle in the fourth, and the collimation reading in the fifth column. This last reading shows the position of the index attached to the cord which moves the screw regulating the inclination of the mirror to the meridian. The collimation is referred to the reading at which the mirror is inclined 45° to the meridian. In this position, a star on the meridian is reflected into the centre of the field of the telescope. Increasing the collimation by unity inclines the mirror by 7′.5, so that a star on the equator will be reflected into the field, if its hour angle is one minute. The estimated brightness of the star is given in the sixth column. These estimates like those made with transit instruments are rough, but serve, in some cases, to detect errors. The seventh column refers to a series of remarks entered in the observing book at the time of observation. When too long to be entered in this column they are given in the remarks following the Table, and are referred to by the letter R. They are expanded, when necessary, to render them more intelligible. The letter H, followed by a number, indicates that the observer stepped out upon the balcony, and satisfied himself that no clouds affecting the observations were near the meridian. The number indicates his estimate of the clearness of the sky, 1 denoting very clear, and 10 very hazy. This estimate was generally made after every tenth star, but more frequently when clouds were suspected. This scale was later reduced to a scale of 5. The letters D, E, F, and G indicate adjacent stars whose positions had already been entered on the observing list, and were confirmed by the observer, in this way insuring the correct identification of the star measured. Thus, "D 8.5 p $1^m.2$, n 6′" is read D equals an eight and five tenths magnitude star which precedes one and two tenths minutes, north six minutes. When the observer indicated the positions of adjacent stars, this is shown by the letter C. The position was recorded in the same way, and was compared the next day with the catalogue position. The designation in the Durchmusterung, of these adjacent stars, is given in the Remarks. In the later work the number of these stars was increased, so that, in some classes of work, one or more companions were given for every star.

It will be noticed that all the facts so far described were entered in the record. The next three columns give the right ascension, the declination, and the mean magnitude. The last three columns give the errors in the observed declination, in the observed collimation, and in the measured magnitude. The first and second of these quantities were found graphically. After the recorder had made an approximate setting, the observer brought the star into the centre of the field and the recorder then read the declination circle while waiting for the second setting, and the time and collimation while waiting for the third setting. The record thus gives the position of the object observed whether it was the star intended, or not. A wrong identification at once appears from large values in these two columns. The residuals in the last column, like the magnitudes in the tenth column, were generally taken from H. A. **44** or **45**. The error in the observation is indicated by these residuals.

As the observations on this day, December 19, 1894, were very near the winter solstice, it follows that they lasted from about 5.00 to 6.30 and from 7.30 to 12.15 in the evening, expressed in mean time. During these six and a quarter hours, 322 stars were looked for, and 316 measured, as 6 were too faint to be seen. The total number of photometric settings was, therefore, 1264. The average time occupied in measuring each star did not exceed a minute in ordinary routine observations.

TABLE I.

DETAILED OBSERVATIONS.

S. T.	Desig.	Readings.				Dec.	Coll.	Est.	Rem.	R. A.	Dec.	Magn.	Dec.	Coll.	Err.
h. m.		°	°	°	°	° ′				h. m.	° ′		′		
23 7.8	λ	72.1	188.2	180.3	268.8	89 20	15.2	. .	H 2 R	19 22.5	+88 59	6.53	. .	. .	. .
9.8	S.u. 4098	160.4	288.2	238.7	32.1	74 50	13.2	5.8	D	23 4.7	+74 51	4.63	+4	+0.3	.30
11.8	S.u. 4127	239.4	31.9	339.8	123.1	67 42	10.9	. .	. .	23 14.5	+67 34	4.89	+1	+0.3	*.43*
15.2	S.l. 1966	354.8	91.9	74.1	191.8	114 47	11.7	. .	. .	11 16.9	+64 53	5.88	0	0.0	*.23*
18.6	l. 1974	94.2	177.2	185.6	260.3	123 5	11.7	7.0	. .	11 20.4	+56 24	5.76	+3	0.0	*.01*
20.7	l. 1979	176.4	273.8	261.4	8.6	117 18	12.1	5.4	. .	11 23.4	+62 19	5.74	0	−0.1	*.08*
21.8	l. 1981	264.8	3.4	7.6	86.1	122 18	11.7	6.5	D	11 24.2	+57 17	5.99	−2	−0.3	*.35*
23.8	S.l. 1988	331.9	120.7	58.8	207.2	109 48	11.8	4.2	. .	11 25.5	+69 53	4.10	+1	0.0	*.29*
25.2	+37° 4817	68.7	198.6	167.2	284.2	37 48	18.8	5.4	. .	23 16.1	+37 38	5.81	+1	+0.4	.09
26.9	+37° 4820	194.1	257.2	269.8	6.7	38 14	18.7	7.3	. .	23 16.4	+38 3	7.44	+2	−0.9	.16
28.2	+31° 4901	261.2	6.9	350.7	92.1	32 9	18.2	6.4	. .	23 18.8	+31 58	6.59	+2	−0.8	.11
29.1	+32° 4649	9.1	82.1	89.1	178.1	32 37	16.1	7.4	. .	23 22.9	+32 26	7.40	+2	−0.3	.10
29.8	+34° 4938	92.1	171.2	196.8	258.1	34 38	15.1	7.6	. .	23 25.0	+34 27	7.90	+2	0.0	.10
30.9	+37° 4856	176.2	278.4	257.1	18.2	38 15	15.3	6.8	D	23 25.8	+38 6	6.21	0	0.0	.19
32.3	+33° 4721	267.2	354.3	5.1	82.9	33 26	16.2	7.2	C	23 25.9	+33 17	7.35	0	−0.4	.15
33.0	+38° 5023	340.3	109.2	63.8	204.2	38 50	16.4	4.8	H 2	23 26.3	+38 42	5.33	−1	−0.1	*.03*
34.6	+37° 4861	99.7	181.9	185.2	262.4	37 55	16.4	7.3	. .	23 27.1	+37 45	7.55	+1	−0.7	.05
35.2	+40° 5103	183.1	267.4	262.5	1.2	41 15	15.8	7.2	. .	23 28.7	+41 5	7.12	+1	−0.4	*.02*
35.8	+30° 4978	242.9	21.9	338.6	109.7	30 55	16.7	5.4	. .	23 29.0	+30 46	5.25	−1	−0.2	.05
37.	A 31955	. .	. .	. .	. .	. . . .	. .	. .	n.s.	23 32.5	−46 3	. .	. .	. .	. .
38.	l. 2018	. .	. .	. .	. .	. . . .	. .	. .	n.s.	11 40.8	+48 20	. .	. .	. .	. .
38.7	+33° 4738	4.6	90.3	88.4	176.2	33 56	18.2	7.1	. .	23 29.6	+33 49	7.30	−3	−0.6	.00
39.6	+36° 5082	89.1	181.0	186.2	264.2	37 25	19.1	6.7	. .	23 29.7	+37 14	7.25	+2	0.0	.15
40.2	+37° 4866	178.4	274.2	263.9	12.1	37 40	19.2	6.5	. .	23 29.9	+37 29	6.34	+2	−0.1	.36
40.8	+31° 4935	263.5	14.2	355.1	91.9	31 46	19.9	6.6	. .	23 30.5	+31 39	6.62	−2	0.0	.08
41.6	+31° 4952	5.9	89.2	90.2	177.1	32 11	15.8	7.0	H 2	23 36.3	+32 0	7.25	+2	+0.1	.15
42.6	+33° 4763	90.2	179.4	183.1	266.2	34 20	15.1	6.8	. .	23 38.1	+34 11	7.35	0	+0.7	*.05*
43.8	+35° 5086	186.4	261.2	269.2	359.8	35 55	14.8	7.1	. .	23 39.2	+35 47	7.40	−1	−0.1	.10
44.4	+32° 4703	274.8	357.8	359.2	84.7	32 55	14.1	7.2	. .	23 40.8	+32 44	7.30	+2	−0.1	.10
45.3	+33° 4768	7.6	74.1	99.1	175.0	33 48	14.4	7.2	. .	23 41.3	+33 39	7.85	0	−0.3	.05
46.4	+36° 5117	99.9	170.6	198.2	250.3	37 8	14.4	7.5	C	23 41.7	+36 57	8.08	+2	−0.5	.22
47.3	+33° 4773	184.2	264.8	273.1	358.1	34 6	14.2	6.8	. .	23 42.5	+33 59	7.55	− 2	−1.0	*.05*
48.2	+35° 5110	254.1	18.2	344.2	105.4	36 7	13.4	5.6	D	23 44.6	+35 53	5.82	+5	−0.7	.08
49.2	+37° 4898	0.8	86.4	90.4	182.6	37 29	12.7	6.6	. .	23 46.9	+37 20	7.05	0	−0.3	.15
49.9	+40° 5167	86.4	181.9	181.0	265.1	40 55	12.8	7.0	. .	23 47.9	+40 47	7.25	− 1	0.0	*.05*
50.7	+31° 4989	184.2	261.2	274.2	357.8	31 30	13.2	7.4	H 2 C	23 48.1	+31 21	7.36	0	−0.1	.24
51.8	+34° 5028	278.6	352.2	12.7	76.4	34 36	14.4	. .	C	23 48.2	+34 29	7.90	−2	+0.2	.10
52.9	+38° 5091	357.2	91.9	80.2	188.9	38 52	14.2	6.6	. .	23 49.0	+38 44	6.71	−1	−0.1	.09
53.8	+32° 4735	94.4	181.9	192.9	263.8	32 28	13.8	7.2	. .	23 50.3	+32 20	7.60	−1	−0.3	.10
54.6	+38° 5104	187.2	261.9	267.4	0.7	38 45	11.7	7.4	. .	23 53.9	+38 34	7.35	+2	−0.1	.05
55.2	+38° 5108	259.2	15.2	351.9	94.2	38 27	11.4	6.4	. .	23 54.9	+38 18	6.61	0	−0.1	*.11*
56.4	R Cassiop.	22.6	67.8	108.7	161.9	51 0	13.8	. .	D, E, F	23 53.3	+50 50	var.	+1	+0.4	. .
57.4	" "	111.1	161.4	206.4	246.2	" "	14.2	. .	. .	" "	" "	"	+1	+0.2	. .
58.2	+32° 4747	166.4	280.2	250.6	22.0	33 19	14.8	5.4	. .	23 54.4	+33 11	5.88	−1	+0.4	.02
59.6	+36° 5141	271.2	354.2	7.6	83.4	37 25	15.2	7.2	R	23 54.6	+37 14	7.80	+2	0.0	*.20*

S. T.	Desig.	Readings.				Dec.	Coll.	Est.	Rem.	R. A.	Dec.	Magn.	Dec.	Coll.	Err.
h. m.	°	°	°	°	°	° ′				h. m.	° ′		′		
0 0.8	+37° 4912	358.6	95.9	75.6	196.2	37 55	15.9	6.1	H 3	23 55.1	+37 45	6.58	+ 1	+0.2	*.08*
1.7	+33° 4827	82.1	190.2	182.6	265.9	33 50	12.6	7.3	..	23 59.5	+33 42	7.15	− 1	−0.4	*.15*
2.4	+33° 4828	165.4	278.6	253.6	16.2	34 18	13.2	6.0	..	23 59.6	+34 7	6.23	+ 2	−0.3	*.13*
3.0	+39° 2	266.2	356.1	5.1	80.7	39 40	12.2	7.4	C	0 2.4	+39 31	7.50	0	+0.4	.00
4.0	+38° 2	15.2	76.4	94.2	172.4	38 40	12.7	7.5	..	0 2.5	+38 30	8.00	+ 1	+0.2	.00
4.9	+36° 1	88.2	181.4	190.7	261.9	36 46	13.2	6.8	..	0 2.5	+36 37	7.55	0	+0.9	*.05*
5.6	+30° 3	185.2	267.2	267.1	1.2	30 58	13.4	7.3	C	0 3.0	+30 49	7.30	0	+0.1	.00
6.3	+34° 3	267.4	357.8	7.2	88.6	34 32	14.2	7.5	..	0 3.3	+34 22	7.40	+ 1	+0.5	.00
7.8	+32° 11	358.2	89.8	87.6	181.9	32 45	12.7	6.7	..	0 5.4	+32 35	7.15	+ 1	−0.5	*.05*
8.3	+36° 8	88.9	176.2	194.6	259.2	37 5	13.2	7.5	..	0 5.6	+36 55	7.75	+ 1	−0.2	*.05*
8.9	+34° 13	191.4	253.2	274.1	356.8	34 55	12.4	7.5	H 3	0 7.9	+34 44	7.90	+ 2	+0.4	.00
9.8	+34° 20	274.2	348.4	12.2	82.6	34 28	11.2	7.6	..	0 9.9	+34 19	8.00	0	+0.1	*.10*
10.8	+32° 26	7.1	81.9	88.6	174.1	32 37	11.7	7.3	..	0 9.9	+32 28	7.55	0	−0.3	.05
11.9	+35° 34	91:2	178.8	192.8	261.2	36 15	11.2	7.3	R	0 11.5	+35 55	7.70	+11	−0.3	.00
13.8	+35° 35	180.7	271.2	264.2	7.2	36 18	13.2	6.2	..	0 11.5	+36 5	7.01	+ 4	+0.1	*.11*
14.8	+35° 44	236.8	32.1	332.1	115.1	36 28	12.7	..	..	0 13.1	+36 14	4.44	+ 5	+0.1	*.04*
15.3	+36° 32	10.9	86.2	89.9	181.2	36 35	12.2	7.3	..	0 14.5	+36 24	7.41	+ 2	+0.4	.09
16.2	+39° 80	100.8	170.3	191.8	253.1	39 28	8.7	7.5	..	0 20.1	+39 17	7.88	+ 2	+0.4	.32
17.3	+34° 51	191.2	257.2	277.2	358.6	34 36	8.8	7.4	C	0 20.1	+34 29	7.80	− 2	−0.1	.00
18.2	+33° 44	275.2	356.2	10.9	79.2	33 48	8.2	7.5	D	0 21.4	+33 38	7.80	+ 1	−0.3	.00
20.9	A 167	358.2	91.0	81.6	188.2	327 55	18.1	5.0	..	0 11.1	−32 0	5.88	− 5	+0.1	.06
..	A 218	..	..	..	..	.. ..	..	..	n.s.	0 13.8	−43 48	..	..	..	..
22.6	A 351	87.8	183.6	177.2	268.2	315 45	10.7	6.8	..	0 21.3	−44 14	3.69	+ 2	+0.2	*.35*
23.4	A 355	155.6	289.2	245.2	28.1	317 3	11.7	..	..	0 21.3	−42 51	2.42	− 4	+0.6	*.26*
24.9	A 377	254.8	11.2	344.6	102.1	326 20	11.2	5.8	..	0 22.9	−33 34	5.10	− 6	−0.1	.04
26.2	S.u. 71	332.1	119.7	54.9	213.1	62 30	10.7	4.8	D, E	0 27.3	+62 23	4.23	− 1	−0.4	*.17*
27.2	S.u. 104	64.2	203.2	164.2	286.2	74 35	8.2	..	D	0 39.0	+74 26	5.65	+ 4	−0.2	*.22*
28.2	+36° 66	172.6	271.9	257.2	11.6	36 30	15.3	6.8	..	0 23.7	+36 21	6.44	0	+0.5	.16
29.2	+32° 71	275.4	355.4	9.8	80.2	32 35	15.1	7.3	..	0 24.4	+32 27	7.77	+ 1	−0.1	.03
30.3	+40° 104	14.2	81.0	91.0	179.4	41 8	14.2	7.4	..	0 25.5	+40 58	7.53	+ 1	−0.7	.17
31.4	+38° 64	87.2	178.8	187.8	265.2	38 35	15.1	7.1	H 3	0 26.1	+38 26	7.32	0	−0.3	.08
31.9	+38° 68	185.2	269.2	265.8	7.1	38 25	15.0	..	..	0 27.4	+38 18	7.05	− 2	+0.2	.05
32.9	+39° 115	272.9	352.1	13.6	79.8	39 44	14.9	..	..	0 28.1	+39 33	7.86	+ 2	−0.1	.04
33.6	+30° 77	14.2	79.8	95.6	179.1	31 15	15.2	7.5	..	0 28.9	+31 5	7.66	+ 1	+0.1	.14
34.3	+40° 115	101.9	167.4	198.2	252.6	40 56	14.8	7.6	..	0 29.6	+40 49	8.38	− 2	−0.1	.02
35.1	+36° 87	178.2	274.1	263.4	7.2	36 25	15.2	6.8	..	0 29.8	+36 17	6.82	− 1	−0.3	.18
35.9	+33° 75	283.1	354.8	5.7	78.1	34 2	15.2	7.5	..	0 30.3	+33 54	7.80	− 1	−0.6	.10
36.8	+37° 98	6.2	81.6	96.2	180.7	37 50	15.2	7.1	..	0 30.7	+37 42	7.40	− 1	−0.8	.20
37.2	+39° 154	88.1	178.2	194.2	246.2	39 50	13.1	6.8	..	0 35.3	+39 40	7.52	+ 1	+0.3	.08
38.0	+32° 122	186.4	264.2	261.8	8.7	32 55	11.1	6.8	H 3	0 38.5	+32 46	7.02	0	+0.3	.08
41.0	S Cassiop.	279.2	346.4	15.1	77.2	72 10	2.1	..	D,E,F,G	1 12.3	+72 5	var.	− 1	+0.2	..
41.9	"	16.4	75.2	96.1	166.1	" "	2.3	..	H 4	" "	" "	"	− 1	+0.1	..
1 44.0	L 2338	94.2	169.8	195.9	256.8	129 30	10.7	6.5	H 5 R	1 43.6	+49 49	2.25	+ 3	+0.1	.53
45.1	L 2338(2)	194.6	259.8	268.9	359.2	.. ..	10.0	..	..	1 43.6	+49 49	2.25	+ 3	+0.1	.23
..	1623	..	..	..	..	.. ..	..	..	n.s.	1 35.8	−34 59	..	..	..	..
..	A 1864	..	..	..	..	.. ..	..	..	n.s.	1 49.6	−46 48	..	..	..	..
51.0	A 1871	274.2	356.2	5.6	78.2	316 58	10.2	..	..	1 50.2	−43 0	4.86	0	+0.4	*.16*
53.4	A 1973	9.2	77.2	98.3	161.2	317 28	7.2	..	..	1 55.5	−42 31	5.43	− 1	−0.6	.00
54.6	A 1998	73.1	195.1	173.2	285.2	329 30	6.9	..	..	1 56.8	−30 28	5.49	− 2	−0.9	*.15*
56.3	S.U. 287	151.4	301.7	231.8	36.9	63 20	16.1	4.6	D	1 47.2	+63 11	3.39	+ 1	−0.4	.27

S. T.	Desig.	Readings.				Dec.	Coll.	Est.	Rem.	R. A.	Dec.	Magn.	Dec.	Coll.	Err.
h. m.		°	°	°	°	′				h. m.	° ′		′		
1 58.2	S.U. 304	241.2	30.3	332.1	116.1	70 28	12.8	..	H5,D,E	1 53.8	+70 25	4.61	−3	−0.3	*.05*
2 0.8	+40° 411	11.7	89.0	90.7	178.1	41 5	18.2	..	..	1 52.0	+40 54	7.44	+2	+0.4	.06
2.2	+38° 416	92.2	175.6	195.4	257.8	39 2	11.2	..	C	2 2.8	+38 53	7.70	0	+0.4	.20
2.9	+32° 390	194.0	259.0	274.8	354.8	33 2	10.2	7.4	..	2 4.4	+32 53	7.70	0	0.0	.20
4.0	+31° 382	101.6	170.0	196.4	253.3	31 49	9.2	7.5	D	2 6.6	+31 42	8.10	−2	+0.1	.20
5.0	+23° 297	175.9	273.6	254.2	17.2	23 52	8.8	6.5	..	2 6.9	+23 43	6.19	0	−0.5	.18
5.9	+28° 374	262.7	8.8	353.1	94.2	28 24	8.2	..	..	2 8.9	+28 14	6.57	+1	−0.3	.13
6.3	+36° 458	14.2	78.1	99.4	174.8	36 44	6.7	7.5	..	2 12.6	+36 37	8.01	−2	+0.5	*.01*
6.9	+30° 372	88.1	181.9	190.2	268.9	31 3	5.2	7.1	..	2 14.0	+30 54	7.29	0	+0.1	.01
7.8	+37° 533	199.2	255.2	272.9	0.8	38 5	6.2	7.4	C	2 14.5	+37 55	7.93	+1	+0.2	*.03*
9.0	+36° 464	268.8	354.2	7.9	81.2	36 44	6.7	7.3	H 5	2 14.9	+36 37	7.57	−2	+0.2	.03
10.2	+37° 536	16.8	77.2	100.7	168.9	38 13	7.1	7.4	..	2 15.6	+38 4	8.00	0	+0.1	.20
11.2	+37° 544	84.9	184.1	184.2	273.6	38 5	7.2	6.4	C R	2 17.1	+37 49	7.08	+7	+0.6	*.08*
15.1	+33° 422	191.2	258.9	274.1	359.2	33 35	8.2	7.4	..	2 17.9	+33 25	7.62	+1	−0.7	.08
15.9	+38° 472	273.6	354.2	9.7	82.2	39 3	10.0	7.3	..	2 18.0	+38 53	7.72	+1	+0.3	*.02*
16.9	*o* Ceti	22.6	70.0	103.1	160.7	356 35	13.1	..	..	2 14.3	− 3 26	var.	−6	+0.1	..
18.4	"	116.4	156.8	199.1	252.6	" "	14.7	..	..	" "	" "	"	−6	+0.2	..
19.9	+68° 177	197.2	254.8	279.9	359.2	69 0	8.1	8.0	D	2 30.1	+68 52	8.02	+1	−0.1	*.06*
25.9	+18° 337	272.9	7.6	355.1	89.6	18 30	1.7	..	D	2 35.5	+18 23	6.89	−2	−0.1	.08
28.0	+72° 153	17.6	80.2	99.1	169.4	72 18	6.1	..	D,E,F	2 48.4	+72 16	7.92	−4	+0.6	.11
29.2	+72° 152	93.1	172.1	194.9	256.2	72 30	6.9	..	H 5	2 46.2	+72 29	7.66	−5	+0.4	.27
30.3	+72° 153	198.7	253.2	276.2	359.8	72 18	6.2	..	..	2 48.4	+72 16	7.92	−4	0.0	.01
32.2	+24° 376	253.6	17.6	351.0	98.6	24 24	11.2	6.6	A	2 31.3	+24 13	6.18	+2	−0.7	*.01*
32.9	+37° 588	351.9	99.2	78.6	197.9	37 28	12.1	6.0	..	2 32.1	+37 19	6.29	0	+0.3	.01
33.9	+37° 591	72.6	195.8	173.6	275.6	37 50	12.7	6.8	..	2 32.3	+37 40	6.26	+1	+0.2	.04
34.2	+32° 478	180.2	270.2	267.4	1.8	33 8	13.1	6.7	..	2 32.7	+32 59	7.05	0	+0.7	.05
35.2	+33° 481	275.6	354.8	11.0	77.6	33 40	12.2	7.5	..	2 33.8	+33 32	7.75	−1	−0.2	.15
36.9	+32° 484	16.0	71.9	95.2	170.2	32 31	13.7	7.5	..	2 33.8	+32 23	8.15	−1	−0.1	.05
37.4	+29° 453	89.8	176.2	191.2	262.1	29 30	14.1	7.0	..	2 34.4	+29 21	7.45	0	+0.4	.15
38.1	+31° 463	187.2	261.2	275.0	1.1	32 1	14.7	7.2	..	2 34.5	+31 53	7.50	−1	+0.5	.10
44.1	+39° 610	64.2	205.2	156.2	294.0	41 7	17.1	5.2	H 5 R	2 35.9	+39 46	5.00	R	R	.00
44.9	+40° 570	199.2	255.1	272.6	2.0	41 6	18.2	7.6	..	2 35.6	+40 59	7.87	−2	−0.1	.03
46.0	+33° 491	267.8	4.6	357.2	92.2	34 2	19.3	..	..	2 36.2	+33 53	7.05	0	0.0	*.05*
47.2	+32° 490	9.4	82.2	98.2	175.2	32 36	20.2	7.4	C	2 36.7	+32 29	7.60	−2	+0.2	.20
47.9	+31° 472	97.2	182.6	193.9	257.2	32 8	19.9	7.3	..	2 38.0	+31 57	7.70	+2	+0.4	.10
48.2	+40° 570	196.4	258.2	274.2	359.1	41 12	21.7	7.3	C R	2 35.6	+40 59	7.87	+4	+1.0	*.07*
51.6	+38° 599	256.9	15.9	348.1	99.7	38 20	10.2	6.2	..	2 51.7	+38 13	6.12	−2	−1.0	.08
52.3	+31° 512	356.4	93.1	84.1	187.2	32 15	11.2	6.8	..	2 52.2	+32 5	6.74	+1	−.01	.06
53.2	+30° 477	88.9	179.2	188.1	266.2	30 50	10.2	7.3	..	2 54.2	+30 43	7.40	−2	0.0	.00
55.1	+35° 607	186.2	262.2	267.8	2.1	35 51	11.8	7.2	..	2 55.0	+35 45	7.50	−3	+0.5	*.10*
56.4	+31° 526	261.0	11.0	1.6	97.2	32 9	12.1	6.8	H 5	2 55.4	+32 1	6.71	−1	+0.1	*.01*
57.4	+38° 617	77.8	186.2	175.8	277.1	38 39	12.7	6.8	..	2 55.5	+38 31	6.62	−1	+0.1	*.02*
59.4	+37° 692	183.6	267.4	263.7	8.1	38 10	13.1	7.0	..	2 57.1	+38 1	7.01	0	0.0	*.01*
3 0.0	+35° 616	275.6	350.8	8.8	83.6	36 12	13.9	7.0	..	2 57.3	+36 3	7.80	0	+0.5	.00
0.9	+37° 696	356.8	91.2	91.6	186.2	37 52	14.2	6.8	..	2 57.8	+37 43	6.91	0	+0.6	.09
1.8	+40° 663	79.1	180.3	181.0	262.2	40 52	13.9	7.2	..	2 58.8	+40 44	7.15	−1	+0.3	.05
2.9	+36° 628	182.1	273.9	267.2	3.9	36 32	13.4	6.8	..	2 59.3	+36 24	7.05	−1	−0.7	*.05*
4.8	+31° 534	9.8	76.9	104.1	173.1	31 52	15.6	..	..	2 59.3	+31 42	8.15	+1	−0.2	*.05*
5.3	+31° 536	97.6	174.2	197.8	260.4	31 50	16.1	..	..	2 59.6	+31 39	8.00	+2	+0.2	.00
6.3	+33° 574	190.7	260.8	275.8	353.8	33 48	16.2	7.6	H 6	2 59.8	+33 37	7.75	+2	−0.4	.05

S. T.	Desig.	Readings.				Dec.	Coll.	Est.	Rem.	R. A.	Dec.	Magn.	Dec.	Coll.	Err.
h. m.		°	°	°	°	° ′				h. m.	° ′		′		
3 7.8	+33° 577	275.3	354.8	8.7	78.9	33 52	17.6	7.8	..	3 0.3	+33 44	7.85	− 1	+0.2	*.05*
8.3	+36° 632	11.2	81.6	96.1	182.6	36 25	17.2	7.3	..	3 1.3	+36 15	7.65	+ 1	+0.3	*.05*
9.2	+36° 640	88.1	183.2	178.6	269.8	37 5	16.2	6.8	..	3 3.1	+36 55	7.10	+ 1	+0.2	.00
10.	U Arietis	..	..	..	..	.. ..	..	..	D,E R	3 5.5	+14 25	var.	..	..	..
13.6	+ 0° 565	275.2	352.6	4.2	80.2	1 0	8.9	8.4	D R	3 14.6	+ 0 50	7.40	+ 2	−0.6	.20
14.2	+ 0° 567	355.1	97.2	93.2	180.3	1 20	9.4	6.8	..	3 14.9	+ 1 7	6.80	+ 5	−0.5	.15
15.0	+19° 509	93.2	174.2	192.6	259.2	19 42	11.7	..	..	3 14.7	+19 21	7.67	+12	+0.5	.10
15.9	+19° 510	180.0	263.9	267.2	4.2	19 52	12.2	..	..	3 14.7	+19 30	7.12	+13	+0.2	.05
17.4	+19° 523	271.0	1.0	0.7	84.6	19 45	9.4	7.2	..	3 18.3	+19 33	7.22	+ 2	−0.7	.05
18.7	+11° 462	1.2	83.9	91.9	177.2	12 10	14.2	7.0	H 6	3 15.1	+11 59	7.34	+ 2	−0.1	*.01*
19.9	+ 4° 532	80.7	187.6	175.6	276.2	4 40	11.8	7.1	..	3 18.4	+ 4 31	6.47	+ 1	−0.3	.13
20.3	+18° 484	169.8	275.2	261.2	15.1	18 35	9.2	6.6	..	3 21.4	+18 25	6.45	+ 1	−0.7	*.08*
21.0	+ 1° 597	273.4	358.6	5.2	85.2	2 7	9.9	7.8	..	3 22.0	+ 1 56	7.37	+ 3	−0.3	.03
21.9	+14° 565	0.0	83.2	88.6	181.2	14 48	9.2	7.2	..	3 23.4	+14 39	7.32	0	−0.1	*.05*
22.9	+ 2° 552	78.6	188.9	178.1	274.2	3 5	9.5	6.6	..	3 23.9	+ 2 54	6.54	+ 3	−0.1	.06
23.4	+16° 450	182.7	270.3	264.8	6.7	16 35	10.2	6.6	..	3 24.0	+16 25	7.02	+ 1	−0.1	*.05*
24.8	+17° 564	268.2	4.1	5.6	84.2	17 46	9.9	7.0	..	3 25.6	+17 37	7.22	0	−0.2	.05
25.3	+17° 565	20.0	71.2	100.3	166.2	17 38	10.3	8.4	..	3 25.7	+17 28	8.42	+ 1	−0.2	.05
26.1	+16° 458	81.9	183.2	186.4	268.4	16 25	9.2	6.8	D	3 27.3	+16 15	7.03	+ 1	−0.5	.04
27.3	+17° 575	171.2	280.9	263.4	16.2	17 42	9.2	5.8	H 6	3 28.4	+17 31	6.39	+ 2	−0.6	*.02*
28.2	+18° 507	282.2	351.4	10.7	81.9	18 44	9.4	7.8	..	3 29.6	+18 35	7.87	0	−0.2	.10
28.9	+18° 517	5.4	84.2	95.6	171.6	19 10	7.6	7.4	..	3 32.4	+19 1	7.67	0	0.0	.00
29.8	+13° 579	81.2	184.2	184.2	266.2	13 45	6.7	6.3	..	3 33.7	+13 35	6.89	+ 1	−0.4	.18
30.7	+16° 484	170.2	278.2	259.8	15.2	16 25	7.6	6.6	..	3 33.8	+16 13	6.28	+ 3	−0.3	.09
31.9	S.u. 583	247.2	26.2	347.8	104.2	63 3	10.3	..	D	3 33.5	+62 54	5.30	0	−0.6	.36
32.6	S.u. 607	338.8	113.2	61.9	208.7	71 8	9.7	..	D	3 39.8	+71 1	4.70	− 3	+0.5	.26
33.9	+ 8° 542	92.7	169.8	189.8	263.1	9 1	10.2	7.6	..	3 33.7	+ 8 50	7.72	+ 3	−0.7	.01
34.6	+19° 578	166.4	288.2	247.2	20.2	19 32	8.7	6.2	..	3 36.6	+19 23	5.56	+ 1	−0.3	.11
35.8	+16° 497	267.8	357.1	4.1	89.4	17 8	9.2	7.0	..	3 36.9	+16 58	7.17	+ 1	−0.6	.10
36.9	+ 2° 602	357.8	99.8	84.2	187.2	2 28	6.7	6.4	H 6	3 39.9	+ 2 19	6.71	+ 1	−0.9	*.11*
37.9	+ 6° 582	91.0	183.7	188.6	274.8	7 5	7.8	7.2	..	3 40.4	+ 6 54	7.18	+ 3	−0.4	*.05*
38.6	+ 6° 583	166.8	285.2	257.4	10.9	6 40	7.9	6.2	..	3 40.8	+ 6 30	6.12	+ 2	−0.6	.01
39.0	+13° 594	263.9	7.8	2.1	91.7	13 22	8.8	7.0	..	3 40.9	+13 13	6.80	0	−0.2	.07
39.9	+ 8° 567	9.2	82.6	90.2	176.2	8 44	8.2	7.2	..	3 41.6	+ 8 39	7.38	− 3	−0.8	.15
41.4	+ 8° 574	81.2	188.2	179.2	276.4	9 18	7.2	7.2	..	3 44.3	+ 9 7	6.75	+ 3	−0.6	*.12*
42.8	+ 6° 590	194.2	256.4	278.4	353.9	6 30	7.8	7.6	..	3 44.8	+6 20	7.78	+ 2	−0.9	.15
43.8	+ 1° 668	282.0	348.2	11.2	77.1	1 35	7.4	7.4	C	3 45.9	+ 1 26	7.85	+ 1	−1.1	.15
44.2	+13° 613	14.8	75.9	100.3	170.8	14 12	7.0	7.4	..	3 47.3	+14 4	8.02	− 1	−0.8	.05
44.9	+ 1° 673	85.2	184.6	179.2	272.9	2 0	6.2	6.7	..	3 48.3	+ 1 50	6.73	+ 2	−1.0	.17
46.4	+ 1° 679	178.1	268.2	268.9	2.1	1 53	6.7	7.3	H 6	3 49.5	+ 1 47	6.95	− 2	−0.8	.05
47.2	+16° 527	267.2	359.2	0.2	93.9	16 28	8.2	7.0	..	3 48.7	+16 19	6.89	0	−1.3	.18
47.8	+13° 616	7.2	77.2	97.9	170.2	13 37	9.2	7.5	..	3 49.0	+13 28	7.82	0	−0.4	.05
48.4	+ 2° 628	94.2	178.6	182.4	263.3	2 55	7.2	7.1	..	3 51.4	+ 2 46	7.40	+ 1	−0.4	.00
49.5	+16° 544	168.4	278.2	258.2	12.2	17 10	5.0	6.6	..	3 54.9	+17 0	6.30	+ 1	−0.7	*.03*
50.8	+13° 627	274.2	354.2	5.2	85.2	13 42	5.2	7.5	D	3 55.0	+13 37	7.52	− 4	−1.5	.05
51.3	+ 3° 552	357.8	92.1	88.1	180.7	3 45	4.1	6.8	..	3 57.2	+ 3 34	6.91	+ 3	−0.6	.09
52.0	+ 8° 625	84.2	181.2	183.2	264.2	8 44	4.4	7.1	..	3 57.7	+ 8 37	6.97	− 1	−0.7	.16
52.6	+ 5° 581	146.1	301.2	239.1	32.6	5 50	5.2	4.6	..	3 57.8	+ 5 43	3.85	0	−0.2	.08
54.0	+ 2° 641	275.2	356.8	2.7	87.2	3 5	6.1	7.6	D	3 58.1	+ 2 55	7.35	+ 2	−0.4	.05
55.2	+ 2° 640	359.2	85.2	87.8	181.2	2 56	7.2	..	..	3 58.1	+ 2 47	7.05	+ 1	−0.5	.05

S. T.	Desig.	Readings.				Dec.	Coll.	Est.	Rem.	R. A.	Dec.	Magn.	Dec.	Coll.	Err.
h. m.		°	°	°	°	° ′				h. m.	° ′		′		
3 56.4	+ 2° 645	68.2	202.6	166.1	288.2	2 40	7.1	6.4	. .	3 58.9	+ 2 33	5.44	−1	−1.0	.06
57.4	+17° 676	178.1	272.1	268.9	3.4	17 25	9.0	6.9	. .	3 59.0	+17 15	6.84	+1	−0.4	.13
58.3	+18° 581	278.4	355.1	10.7	81.0	19 2	7.8	7.6	. .	4 0.8	+18 53	7.62	0	−0.7	.15
58.9	+16° 559	10.0	85.1	91.0	176.8	16 22	7.1	7.4	. .	4 2.3	+16 16	7.52	−3	−0.5	.05
59.8	+ 6° 637	84.9	185.2	177.2	271.2	6 38	5.9	6.8	. .	4 4.1	+ 6 28	6.74	+2	−0.5	.09
4 0.2	+ 2° 655	176.2	274.2	264.4	9.7	3 12	6.4	6.2	. .	4 4.5	+ 3 3	6.51	+1	+0.1	.21
1.0	+18° 594	261.9	6.4	354.8	94.2	18 20	7.1	6.9	. .	4 4.9	+18 10	6.62	+1	−0.1	.05
2.0	+15° 592	359.8	93.1	89.9	181.9	15 52	7.6	7.2	. .	4 5.2	+15 42	7.17	+1	−0.1	*.10*
2.8	+16° 567	84.6	184.1	183.4	266.2	16 30	8.1	6.5	. .	4 5.4	+16 22	7.02	−1	−0.3	.15
3.8	+ 8° 651	173.4	279.1	263.4	8.1	8 48	5.2	5.8	H 6	4 8.1	+ 8 38	6.45	+2	−1.2	.08
5.5	+14° 672	281.9	352.1	11.2	78.2	14 28	7.2	8.4	C	4 8.7	+14 18	7.92	+1	−0.5	.05
6.3	+14° 673	104.8	158.6	200.3	251.2	14 32	8.2	8.2	. .	4 8.8	+14 22	8.47	+1	−0.2	.20
7.8	+15° 607	175.1	270.2	266.1	7.6	16 8	7.6	7.0	. .	4 11.2	+15 58	6.84	+1	0.0	.03
10.4	+13° 659	271.2	1.2	359.1	90.2	13 44	9.1	7.3	. .	4 12.1	+13 36	7.02	−1	−0.1	.15
11.7	+13° 661	3.2	78.6	98.8	172.6	13 37	9.1	7.3	. .	4 13.5	+13 28	7.72	0	0.0	.05
12.4	+13° 663	71.2	201.2	166.9	285.6	13 56	9.0	6.0	. .	4 14.3	+13 48	5.64	−1	0.0	.13
13.5	+11° 592	187.6	261.0	279.2	358.2	11 55	10.2	7.3	. .	4 14.0	+11 43	7.64	+3	−0.1	*.01*
14.0	+13° 665	251.9	9.8	350.8	99.2	13 47	9.0	6.8	. .	4 15.2	+13 38	6.14	0	−0.6	.13
15.0	+13° 667	2.8	86.2	92.7	179.0	13 30	9.2	7.4	. .	4 16.1	+13 21	7.34	0	−0.5	.03
16.4	+13° 668	71.2	200.3	164.2	283.2	14 0	10.7	. .	H 5	4 16.4	+13 50	5.78	+1	−0.1	*.01*
17.4	+ 8° 672	173.9	280.2	260.3	8.2	9 10	12.4	7.0	. .	4 15.4	+ 8 59	6.45	+3	−0.3	*.02*
18.7	+18° 629	264.8	8.6	0.7	91.0	18 18	13.1	7.2	C	4 15.7	+18 11	6.74	+5	−0.6	.13
19.2	+14° 687	359.0	96.2	81.6	186.2	14 20	14.1	6.8	. .	4 15.9	+14 11	6.71	0	+0.1	.06
20.7	+ 2° 692	84.2	184.6	181.2	271.2	2 20	13.8	7.3	. .	4 16.5	+ 2 10	6.92	+2	−1.0	*.02*
21.9	+16° 586	163.2	284.2	251.6	18.6	16 46	13.7	6.0	. .	4 17.7	+16 32	5.66	+5	−1.2	.11
22.1	+12° 584	279.1	349.8	10.2	81.6	12 55	13.2	7.6	C R	4 18.5	+12 45	7.74	+1	−1.1	.09
22.9	+12° 585	11.7	78.2	94.9	171.2	12 51	14.1	. .	. .	4 19.1	+12 41	7.74	+1	−0.4	.09
23.4	+18° 632	94.2	180.2	191.6	263.8	18 50	15.2	7.3	. .	4 18.9	+18 40	7.41	+1	0.0	.16
24.2	+18° 633	167.2	283.9	252.6	17.8	18 50	15.2	6.0	. .	4 19.1	+18 49	5.96	−8	−0.5	.01
27.2	+18° 634	282.6	344.2	18.2	66.1	18 45	17.4	. .	H 6	4 19.6	+18 37	8.74	−1	−0.7	*.17*
28.2	+18° 636	9.2	81.2	90.0	170.8	18 45	18.2	7.4	. .	4 20.0	+18 39	7.72	−3	−0.5	*.05*
28.9	+17° 719	56.2	208.2	155.9	299.1	17 52	19.4	5.6	. .	4 19.7	+17 42	4.31	+1	−0.1	.16
30.3	H 782	156.8	290.2	255.1	19.9	346 48	15.5	5.4	. .	4 24.5	−13 17	5.35	0	−0.3	*.01*
31.2	H 781	244.8	23.1	342.2	106.2	15 38	16.7	5.6	D	4 24.9	+15 29	5.32	0	−0.1	.15
32.1	+15° 645	346.8	102.1	72.6	192.7	15 48	16.1	7.2	. .	4 26.2	+15 38	6.02	+1	−0.4	.05
33.0	A 5060	97.9	167.2	194.3	254.2	329 27	15.4	8.0	. .	4 26.5	−30 40	7.22	+6	+0.1	.19
34.4	H 797	139.1	311.4	228.6	41.2	16 28	14.4	1.0	. .	4 30.2	+16 19	1.07	0	−0.5	.20
35.2	+15° 661	252.6	18.7	341.2	103.2	16 0	13.4	6.3	C	4 32.5	+15 51	5.84	0	−0.1	*.07*
40.7	A 5187	335.1	116.4	67.2	202.2	329 12	17.2	4.2	H 5	4 31.7	−30 46	3.98	−3	−0.2	.33
41.2	A 5215	87.4	181.2	182.6	267.2	329 5	17.2	6.8	. .	4 33.0	−30 55	6.22	−1	+0.4	.19
42.8	A 5295	178.2	268.2	264.8	4.2	317 56	12.7	6.6	. .	4 37.3	−42 3	4.37	+1	−1.0	.06
44.2	−16° 956	258.2	9.2	352.1	98.7	343 28	9.8	5.8	C	4 44.0	−16 30	5.97	−6	−0.5	.23
45.6	A 5380	10.7	77.6	102.7	167.2	334 42	13.3	7.0	R	4 41.9	−25 20	7.42	0	+0.1	.15
46.4	H 845	56.1	214.1	148.1	302.4	5 35	10.3	4.8	. .	4 45.9	+ 5 26	3.66	+1	−0.8	.04
47.3	H 859	151.2	294.8	244.1	25.6	10 10	8.0	4.8	. .	4 49.4	+10 0	4.69	+1	−0.6	.14
48.2	H 862	232.6	37.6	325.1	123.1	33 10	9.2	3.8	. .	4 50.5	+33 0	2.99	+1	−0.2	.31
50.0	Neptune	11.7	80.0	91.6	175.2	21 12	9.0	. .	. .	4 50.1	+20 57	. .	+6	−1.9	. .
51.0	"	97.2	176.2	183.1	261.9	" "	9.8	. .	. .	" "	" "	. .	+6	−2.1	. .
54.6	H 874	171.9	277.2	260.7	15.2	345 44	10.9	6.6	. .	4 53.1	−14 24	6.06	+3	−0.8	.08
55.2	H 875	243.2	27.8	336.4	108.2	1 44	11.2	5.2	. .	4 53.4	+ 1 33	4.82	+3	−1.2	.18

S. T.	Desig.	Readings.				Dec.	Coll.	Est.	Rem.	R. A.	Dec.	Magn.	Dec.	Coll.	Err.
h. m.		°	°	°	°	° ′				h. m.	° ′		′		
4 56.4	Pd. 638	342.4	101.2	78.2	191.2	3 38	11.0	6.0	A,B	4 55.3	+ 3 28	5.98	+2	−0.7	.12
57.4	H 885	64.4	201.2	162.1	288.1	59 0	11.4	5.5	C	4 57.4	+58 50	5.38	+1	−0.1	.12
58.2	H 886	179.2	272.2	260.0	8.2	59 0	12.1	. .	. .	4 57.5	+58 53	6.40	−2	+0.2	.30
58.9	H 896	231.4	36.2	325.2	122.1	41 16	10.8	2.6	. .	4 59.5	+41 6	3.26	0	−0.1	.04
5 0.8	S.u. 836	331.2	119.8	55.9	212.9	66 20	18.1	5.0	. .	4 44.1	+66 10	4.35	+3	−0.2	*.29*
1.6	S.u. 876	57.2	212.2	154.2	297.2	60 27	15.2	4.2	D	4 54.5	+60 18	4.19	0	+0.1	.17
3.2	+ 0° 939	183.1	264.2	267.2	5.1	1 12	13.1	7.0	. .	5 0.2	+ 1 2	var	+2	−0.5	. .
3.9	+13° 803	274.2	354.2	5.2	82.6	14 5	13.1	6.8	. .	5 1.0	+13 57	7.42	−1	−0.5	.15
5.2	+ 7° 812	356.2	95.2	88.2	180.3	7 55	13.2	6.6	H 6	5 2.6	+ 7 46	6.79	+1	−0.1	.14
5.9	+ 3° 785	79.4	185.6	180.3	278.1	3 16	12.7	6.2	. .	5 3.7	+ 3 6	6.54	+2	−0.1	.06
6.7	+ 7° 819	176.2	272.1	275.2	2.2	8 12	12.8	6.8	. .	5 4.5	+ 8 3	7.09	+1	−0.1	*.06*
7.8	+ 6° 864	281.9	353.2	12.1	79.6	6 52	11.2	7.5	. .	5 6.6	+ 6 43	7.74	+1	−0.7	.19
8.3	+ 6° 865	9.2	81.2	98.1	165.2	6 55	12.1	7.6	. .	5 6.7	+ 6 44	7.89	+3	−0.2	.04
9.0	+ 1° 938	79.0	191.6	174.8	278.6	2 0	11.1	6.4	. .	5 8.3	+ 1 51	6.25	+2	−0.8	.15
9.8	+ 8° 900	181.2	268.2	269.8	3.6	8 26	10.7	7.2	C	5 9.7	+ 8 18	7.19	0	−0.1	*.06*
10.9	+12° 760	272.9	359.8	4.6	87.4	12 38	10.2	7.2	C	5 11.5	+12 28	7.24	+1	0.0	.09
11.7	+ 1° 957	350.2	98.2	78.6	188.2	2 0	10.0	5.8	. .	5 11.5	+ 1 50	6.37	+2	−0.8	.03
12.8	+ 2° 916	69.9	198.7	161.8	292.1	2 40	9.2	4.8	. .	5 14.0	+ 2 30	5.40	+2	−0.2	.10
23.7	+ 2° 924	178.6	272.6	264.2	11.7	2 37	18.2	7.3	H 5	5 15.5	+ 2 27	6.66	+2	−0.6	.04
24.6	+ 2° 926	270.7	6.2	352.1	91.8	3 0	19.2	7.4	. .	5 15.6	+ 2 50	6.74	+2	−0.4	.06
25.2	+ 3° 857	353.4	99.2	80.7	189.8	4 2	19.8	6.8	. .	5 16.1	+ 3 54	6.41	0	+0.1	*.01*
26.9	+ 3° 871	63.4	207.2	153.1	292.8	3 36	19.7	5.8	R	5 17.6	+ 3 27	4.93	+1	−0.2	*.13*
27.4	+ 2° 947	167.2	279.8	259.2	13.2	2 25	18.7	7.1	. .	5 19.4	+ 2 15	6.32	+2	+0.1	*.12*
28.1	+ 6° 923	261.2	11.4	351.9	93.4	6 55	17.1	7.3	. .	5 21.2	+ 6 47	6.39	0	−0.4	.14
28.9	+ 3° 903	356.8	98.1	88.9	186.4	3 55	17.1	6.8	. .	5 21.9	+ 3 45	6.61	+2	−0.5	.09
29.8	+ 2° 965	86.2	191.4	175.2	277.4	2 25	17.6	6.9	. .	5 22.0	+ 2 16	6.53	+1	−0.8	.07
30.4	+ 4° 949	170.2	277.8	258.2	13.7	4 19	15.2	6.8	. .	5 25.1	+ 4 7	6.37	+4	−0.7	*.07*
31.0	+ 9° 860	277.1	352.6	9.1	84.1	9 20	14.8	7.4	. .	5 26.2	+ 9 9	7.68	+3	−0.7	.05
32.6	+ 1° 1058	353.1	95.4	79.8	190.3	1 29	13.2	6.6	H 6	5 28.8	+ 1 20	6.42	+1	−1.2	.08
33.2	+ 8° 1016	79.1	192.0	173.2	283.2	9 2	11.0	6.5	. .	5 31.9	+ 8 53	6.09	+1	−1.0	.24
33.9	+ 4° 989	189.2	260.8	277.1	356.8	4 50	12.2	7.3	C	5 31.9	+ 4 42	7.50	0	−0.4	.10
35.1	+ 5° 973	5.6	83.2	92.1	176.1	6 7	12.1	7.4	C	5 32.8	+ 5 57	7.53	+2	−0.9	.00
36.1	+ 8° 1024	90.2	184.2	179.1	267.2	8 35	13.4	6.8	. .	5 32.9	+ 8 26	7.04	+1	−0.5	.09
37.2	+ 4° 1002	152.1	295.2	238.2	30.7	4 12	13.6	4.6	. .	5 33.9	+ 4 4	4.57	0	−0.3	*.17*
38.2	+12° 852	280.2	359.2	1.4	91.0	13 8	13.9	. .	. .	5 34.3	+12 58	7.22	+1	−0.7	.15
38.6	+ 9° 925	4.2	87.1	90.2	173.9	9 20	12.9	7.2	C	5 36.0	+ 9 9	7.38	+3	−0.4	.05
39.6	+ 3° 1007	93.2	175.2	184.6	268.1	3 54	13.9	7.3	. .	5 36.2	+ 3 44	7.20	+2	−0.1	.20
40.3	+18° 920	186.2	262.2	271.4	1.6	19 8	14.1	7.5	D	5 36.6	+18 57	7.47	+2	−0.3	.00
41.9	+ 2° 1040	264.8	5.4	355.1	90.0	2 28	14.9	. .	H 6	5 37.1	+ 2 19	6.61	+1	−0.5	.19
42.3	+14° 991	2.1	91.6	86.2	184.2	14 18	15.2	6.9	. .	5 37.3	+14 8	6.94	+1	−0.4	.13
43.2	+10° 859	98.2	167.4	192.1	255.1	10 36	15.1	. .	D	5 37.8	+10 28	7.83	−1	−0.9	.20
44.0	+ 6° 1005	183.9	272.4	271.6	3.8	7 0	16.1	6.8	C	5 38.2	+ 6 51	7.18	+1	−0.3	*.05*
45.0	+18° 950	266.0	5.2	0.1	89.7	18 50	15.4	7.2	. .	5 39.3	+18 40	6.90	+1	−0.9	.07
45.9	+12° 884	355.6	96.2	88.9	190.0	13 0	16.0	6.7	. .	5 39.4	+12 51	6.60	0	−1.1	.17
46.4	+12° 889	91.2	175.8	189.9	259.8	12 55	16.7	7.6	. .	5 39.7	+12 44	7.54	+2	−0.7	.09
47.0	+ 6° 1012	185.1	264.2	274.2	358.4	6 28	17.2	7.2	. .	5 39.6	+ 6 19	7.23	+1	−0.8	.20
47.6	+ 6° 1014	275.1	357.2	357.2	85.6	6 24	17.8	7.4	. .	5 40.0	+ 6 14	7.38	+2	−0.4	*.05*
48.6	+10° 885	8.4	79.8	98.2	72.1	11 0	17.6	. .	. .	5 41.1	+10 53	7.64	−2	−0.5	.19
49.8	+10° 886	100.0	169.2	191.9	257.2	11 10	18.6	7.4	H 5	5 41.2	+11 0	7.81	+1	−0.6	.22
50.7	+12° 896	189.4	261.4	276.2	353.8	12 26	19.2	7.3	. .	5 41.6	+12 18	7.19	−1	−0.5	.54

S. T.	Desig.	Readings.				Dec.	Coll.	Est.	Rem.	R. A.	Dec.	Magn.	Dec.	Coll.	Err.
h. m		°	°	°	°	° ′				h. m.	° ′		′		
5 51.2	+12° 902	260.0	3.8	357.1	95.8	12 32	19.0	7.1	..	5 42.4	+12 23	6.57	0	−0.4	.16
51.9	+ 4° 1038	5.0	83.6	97.6	171.2	4 12	20.0	7.3	..	5 42.2	+ 4 3	7.54	+1	−0.3	.06
52.8	+18° 970	92.6	184.6	185.2	263.9	18 20	20.0	6.8	..	5 42.9	+18 12	7.22	−1	−0.3	.15
53.2	+ 3° 1041	195.1	260.0	276.2	353.1	4 2	20.6	7.5	C	5 43.0	+ 3 52	7.70	+2	−0.2	.10
54.6	+ 7° 1016	273.1	357.2	359.8	88.6	7 40	21.9	7.2	..	5 43.1	+ 7 31	7.13	+1	−0.2	.10
55.2	+11° 945	359.8	85.2	85.2	177.4	12 6	22.1	6.8	..	5 43.2	+11 57	6.90	0	−0.5	.23
55.6	+ 0° 1184	91.9	176.8	183.2	267.0	0 50	22.6	7.2	..	5 43.6	+ 0 42	7.20	0	+0.1	.10
56.8	+ 1° 1148	168.7	277.2	259.8	9.2	2 10	21.9	6.2	..	5 45.3	+ 2 0	6.25	+2	−0.2	.15
57.8	+ 6° 1051	281.6	345.9	14.4	82.6	6 18	20.9	7.7	H 5	5 47.1	+ 6 11	7.00	−1	−0.4	R
58.6	+11° 960	6.9	86.8	89.1	176.2	11 56	21.0	7.0	..	5 47.6	+11 48	7.20	−1	−0.6	.13
59.1	+11° 964	81.4	189.2	179.2	273.5	11 55	20.2	6.8	..	5 48.9	+11 45	6.46	+1	−0.6	.27
59.8	+ 3° 1071	175.1	274.1	265.8	9.3	3 22	21.2	6.6	..	5 49.0	+ 3 13	6.55	+1	−0.2	.15
6 0.3	+ 5° 1044	271.8	2.9	354.8	88.2	6 0	21.2	6.8	..	5 49.6	+ 5 51	6.73	+1	−0.1	.30
1.2	+ 0° 1208	347.2	101.0	85.1	189.8	1 6	22.2	..	..	5 49.6	+ 0 57	6.21	+1	0.0	.19
2.2	+ 1° 1170	90.0	175.8	181.4	263.1	2 0	19.2	7.2	..	5 53.0	+ 1 52	7.20	0	−0.6	.10
3.2	+ 1° 1191	191.6	255.8	278.2	353.8	1 55	17.2	7.1	D	5 56.9	+ 1 45	7.83	+2	+0.3	.07
5.2	+ 1° 1193	289.2	347.2	15.2	72.6	1 55	18.2	..	..	5 57.0	+ 1 43	8.56	+4	−0.6	*.16*
5.6	+17° 1109	4.2	79.2	96.2	176.2	17 19	18.2	7.3	..	5 58.0	+17 7	7.52	+3	0.0	.15
6.7	+14° 1136	82.2	185.6	182.1	272.1	14 34	17.9	6.8	H 5 C	5 59.2	+14 24	6.74	+1	−0.2	.13
9.0	A 7024	173.2	273.1	261.4	8.6	359 10	26.1	..	..	5 53.1	− 1 1	6.33	+4	−0.3	.24
10.3	A 7032	274.2	358.2	1.2	89.8	341 59	26.2	7.2	..	5 53.2	−18 4	6.92	−1	0.0	.05
10.9	A 7079	0.9	82.2	96.1	175.1	347 16	26.4	7.5	..	5 54.8	−12 51	7.34	+2	−0.6	.00
11.6	A 7101	83.4	186.9	180.2	270.3	347 12	26.1	6.3	..	5 55.7	−12 54	6.48	+1	+0.5	.16
12.7	− 7° 1246	199.8	255.9	280.7	349.2	352 28	27.6	8.2	..	5 55.6	− 7 36	8.13	−2	+0.4	*.03*
13.4	− 7° 1248	281.9	351.2	11.1	80.3	353 38	28.2	..	..	5 55.7	− 7 29	7.30	+1	+0.4	R
14.1	A 7144	0.9	90.2	94.2	180.3	352 46	27.2	6.6	..	5 57.3	− 7 18	6.90	−2	+0.3	.24
14.6	A 7165	88.0	174.9	185.6	261.9	357 36	27.1	7.0	..	5 58.3	− 2 29	7.02	−2	+0.3	.35
15.2	A 7198	181.9	275.1	275.1	2.4	358 32	26.2	6.8	..	5 59.7	− 1 35	6.82	0	+0.2	.25
16.7	−17° 1344	285.1	347.6	8.2	76.2	342 8	25.2	7.8	..	6 0.4	−17 57	7.82	+1	−0.4	.05
17.3	−18° 1291	20.2	76.2	107.2	164.2	341 59	26.4	..	..	6 0.5	−18 4	7.93	−1	+0.3	.24
17.8	− 5° 1499	88.4	176.5	182.0	267.2	354 12	26.7	6.8	..	6 1.1	− 5 52	7.17	−2	−0.2	*.03*
18.7	A 7251	159.2	291.6	251.9	18.6	355 52	26.9	4.4	..	6 1.6	− 4 11	5.33	−4	−0.6	.11
21.0	λ	180.3	264.1	257.1	10.9	90 50	13.4	..	H 5 R	19 22.5	+88 59	6.55	..	..	..

REMARKS.

h. m.

23 7.8. Position of λ Ursae Minoris, in northern telescope, 8.7, +0.

23 21.8 D = +57° 1326.

23 30.9 D = +37° 4852.

23 32.3 C = +32° 4655.

23 37. Not seen. Time of observation not recorded.

23 46.4. C = +36° 5114.

23 48.2. D = +35° 5107.

23 50.7. C = +31° 4995.

h. m.

23 51.8. C = +34° 5025.

23 56.4. D= +50° 4199. E= +50° 4193. F= +50° 4201.

23 59.6. Object intended +38° 5108, but the readings of the position show that an error of one degree was made in the setting of declination, and that the object actually observed was +36° 5141.

0 3.0. C = +39° 3.

0 5.6. C = +30° 2.

0 11.9. The observer was in doubt regarding the iden-

h. m.

tification, and estimated the position of the adjacent star, C = 35° 35, which, with the readings, showed that the object observed was +35° 34.

0 17.3. C = +34° 53.

0 18.2. D = +33° 39.

0 26.2. D = +62° 107. E = +62° 109.

0 27.2. D = +74° 29.

0 41.0. D = +71° 64. E = + 71° 67. F = +72° 68. G = +72° 69.

0 41.9. An interval of one hour for dinner, after observing this star.

1 44.0. Position of λ, in northern telescope, 9.0, +6.

1 56.3. D = +62° 322.

1 58.2. D = +70° 153. E = +70° 157.

2 2.2. C = +38° 413.

2 4.0. D = +31° 386.

2 7.8. C = +37° 536.

2 11.2. C = +37° 536 and +37° 533. Identification called for by observer.

2 19.9. D = +68° 176.

2 25.9. D = +17° 414.

2 28.0. D = +72° 152. E = +72° 147. F = +72° 154.

2 30.3. See $2^{h}\ 28^{m}.0$ for first observation.

2 32.2. A denotes that although +24° 375 was near, the light of +24° 376, only, was measured.

2 44.1. The recorder first set on +40° 540, and recorded its position. He detected the error and set on +39° 610, but failed to enter the position of that object.

2 47.2. C = +32° 492.

2 48.2. Recorded +40° 577, but the companion C, which is +40° 577, and the readings show that the object observed was +40° 570.

3 10. The companions, D = +14° 526, E = + 14° 480, show that the region was correctly identified, but the star was too faint to be measured.

3 13.6. Variable? 0.5 fainter than D, which is +0° 567.

3 26.1. D = +16° 454.

3 31.9. D = +62° 604.

3 32.6. D = +71° 216. Recorded S.u. 583.

3 43.8. D = +1° 667.

3 50.8. D = +13° 621.

3 54.0. D = +2° 640.

4 5.5. C = +14° 673.

h. m.

4 18.7. C = +18° 709.

4 22.1. Recorded +15° 584, but the companion C, which is +12° 585, and the readings show that the object observed was +12° 584.

4 31.2. D assumed to be +15° 640.

4 44.2. C = −16° 958 and −16° 964.

4 35.2. C = +15° 666.

4 45.6. Recorded A 5412, but identification called for by observer. The position shows that the object observed was A 5380.

4 55.2. Recorded +14° 796, but the position shows that the object observed was H 875.

4 56.4. Potsdam 638. AB denotes that the combined light of +3° 736 and +3° 737 was observed.

4 57.4. C = +58° 805.

5 0.8. C = +66° 360.

5 1.6. D = +60° 855.

5 9.8. C = +8° 903.

5 10.9. C = +12° 758.

5 26.9. +3° 872 is too near to be observed separately.

5 33.9. C = +4° 982.

5 35.1. C = +6° 974.

5 38.6. C = +9° 921.

5 40.3. D = +18° 923.

5 43.2. D = +10° 855.

5 44.0. C = +6° 1007.

5 53.2. C = +4° 1038.

5 57.8. Residual +1.03 magn., rejected for discordance. See H.A. 45, 313. The position shows that the star was correctly identified, and the four settings give residuals, from their mean, of +0.1, +0.1, +0.3, −0.4 magn., showing that all agree in indicating that the star was faint. No explanation of this discordance has been found. A passing cloud would probably have affected the four readings unequally.

6 3.2. D = +1° 1195.

6 6.7. C = +14° 1139.

6 13.4. Declination recorded 353°, should perhaps be 352°, but as the resulting magnitude is rather discordant the observation has been rejected.

6 21.0. The position angle of the northern image of λ was 135° when the handle of the double image prism was turned up.

A grouping is made in Table II of the results given in Table I. Each group, except the last, contains twenty stars, including those in which the object was set on, but not seen. The time of observation of the first star in each group is given in the first column. The time occupied in observing the group, divided by twenty, is given in the second column. One hour is omitted from the fifth group to allow for the time during which the observations were suspended. The means of the errors in declination and in collimation are given in the third and fourth columns. The algebraic mean and the arithmetical mean of the results given in the last column of Table I are given in the fifth and sixth columns. The fifth column shows whether the stars were observed systematically too bright or too faint, during any portion of the series. The sixth column shows the average error in determining the magnitudes of the stars. The seventh column shows the average error derived from the first differences of the last column of Table I. The results for the entire series are given in the last line of the Table.

TABLE II.

RESULTS OF TABLE I.

S. T.	Int.	Dec.	Coll.	Δ	A. D.	Diff.	S. T.	Int.	Dec.	Coll.	Δ	A. D.	Diff.
h. m.	m.	′	m.				h. m.	m.	′	m.			
23 7.8	1.5	1.3	.29	−.01	.15	.11	3 42.8	0.9	1.4	.72	+.09	.09	.05
38.	0.9	1.6	.28	+.10	.11	.09	4 0.2	1.1	1.5	.36	+.07	.09	.08
55.2	1.0	1.5	.30	−.05	.06	.06	22.1	1.3	1.8	.42	+.10	.13	.10
0 14.8	1.0	2.3	.26	+.01	.12	.11	48.2	1.1	2.0	.54	+.10	.14	.11
35.1	1.5	1.3	.35	+.12	.17	.13	5 10.9	1.4	1.4	.52	+.04	.09	.08
2 5.0	1.5	2.3	.31	+.05	.08	.07	38.6	0.8	1.3	.49	+.14	.15	.10
34.2	1.4	1.2	.34	+.04	.07	.06	55.2	0.9	1.4	.33	+.12	.14	.09
3 1.8	1.1	2.8	.35	+.03	.06	.05	6 14.1	1.0	1.7	.33	+.17	.18	.13
23.4	1.0	1.4	.44	+.06	.10	.08	All.	1.1	1.7	.39	+.07	.11	.08

The average error in setting was less than 2′ in declination, and $0^{m}.4$ in collimation. As the diameter of the field is about 45′, the object observed could be identified with certainty in almost all cases. The average deviation, expressed in magnitudes, was ±0.11. On this evening, the stars were measured 0.07 magn. too faint. Allowing for this, the accidental error of a single observation of four settings was ±0.09 magn. The same quantity, derived from the seventh column, is ±0.08. In brief, a star was observed in one minute, with an accuracy of a tenth of a magnitude. There was no perceptible change in the speed or in the accuracy of the settings, and although the residuals in magnitude appear to increase, this is due to the increase in the systematic error, Δ. This systematic error is probably due to variation in the amount of haze in different portions of the sky, or to other causes beyond the control of the observer. An examination of the Summary of Series in H. A. 44, 125, shows that observations extending over four hours, and including two hundred or more stars, were not unusual.

MAGNITUDES OF COMPONENTS OF DOUBLE STARS.

THE first photometric investigation undertaken by this Observatory in 1877 was the determination of the relative brightness of the components of double stars. The results of this investigation are given in H.A. 11, Part I. The photometer employed is there described and figured on page 4, and some of the improvements mentioned below are also described in H.C. 25. It consists of a double image Rochon prism which can be moved along the axis of the telescope to any desired distance from the focus, and a Nicol prism, placed over the eyepiece, which can be turned by any desired amount and the angle measured by a graduated circle and index. When a double star is to be measured, the double image prism is moved until the two images of the components are at exactly the same distance apart as the two components of the star. The four images will thus form a rhombus. The Nicol prism is then turned until the faint image of the bright star appears exactly equal in brightness to the bright image of the faint star. There are four positions in which the images will be equal. Settings were always made in all four positions, taking care to turn the Rochon prism between the second and third, so that the positions of the two images were reversed. This is essential, to eliminate the effect of unequal sensitiveness of different portions of the retina. It is also well to turn the Rochon prism 180°, after each alternate set, and this was always done in the later observations. A table for reducing the observations will be found in H.A.33, 280. This photometer is capable of giving results of a high degree of precision, in fact no other instrument has since been found equal to it for the particular purpose for which it was devised. Some examples of the accuracy attainable are given in H.C. 23, 25, and 30. The principal advantages of this form of photometer are the following: —

1. The scale depends only on the fundamental laws of polarized light, which rest on the trigonometrical principle that the sum of the squares of the sines and cosines of any angle always equals unity. There is no constant to be determined, as in the case of wedge photometers, or those in which shade glasses are used.

2. Both images are seen on the same background, and the light of the two stars passes through nearly the same column of air. Accordingly, haze and cloud affect both images equally, and observations may be made under conditions that would render other observations impossible. Even passing clouds do not affect the observations appreciably, and excellent results may be obtained in twilight, or moonlight.

3. The two images to be compared are exactly alike, and defects due to the telescope or irregular refraction of the air affect both equally. Psychological errors are those most to be feared, and the construction of the instrument is such that they may be, in a great measure, eliminated by reversion.

4. The range of the instrument is very great. Stars which differ five or more magnitudes may be compared with precision. If then a variable or new star had an eighth magnitude star near it, measures could be made when the former star was five magnitudes brighter or five magnitudes fainter than the comparison star. It could thus be followed over a range of ten magnitudes, or from the third to the thirteenth magnitude. The corresponding change in light is from ten thousand to one. This property of the instrument is a valuable one in measuring the components of coarse clusters, like the Pleiades or κ Crucis.

5. Since the object to be measured is compared directly with another star which may be taken as a standard, a single measure only is needed to determine its light. Two measures are required in a photometer in which an artificial star is employed, one of the object to be measured and one of the standard with which it is to be compared. In the latter case, twice as many measures are required, and the accidental errors of setting enter twice. To attain the same degree of accuracy, four times as many settings would be required with such a photometer, as with that here described.

6. Since both images to be compared move together, an accurate driving clock is not needed. This advantage is the same as that of a double image micrometer or heliometer, as compared with a filar micrometer.

The following are the principal disadvantages of this instrument: —

1. The loss of light is large. Since a double image prism is used, half the light, or three quarters of a magnitude, is lost in passing through it, as the entire light is divided into two equal parts. A further loss occurs in the Nicol prism. When the stars to be compared are nearly equal, this loss amounts to another three quarters of a magnitude. When the stars are unequal, the principal loss is in the light of the brighter star, so that when the difference in magnitude is large, the additional loss in the light of the fainter star becomes insensible. In-

cluding the loss by absorption, and by reflection from the eight surfaces, the total loss amounts to about a magnitude and a half. Accordingly, a telescope of 15 inches aperture, capable of showing stars of the magnitude 15.0, cannot be used to measure stars fainter than the magnitude 13.5.

2. The range of application of the instrument is limited. Rochon prisms, as ordinarily made, separate the images by about 1°. If the double image prism is of the usual form, and is moved much more than a foot from the focal plane, it will not be large enough to intercept the entire cones of light of both stars. The limiting distance with a 15-inch telescope is about 3′, and proportionally more for smaller instruments. By using two prisms this limit may be doubled, but the images then appear slightly colored, forming in fact short spectra turned in opposite directions. The position of the Nicol prism in which a bright star will disappear varies slightly in different portions of the field. This effect is doubled if two prisms are used having their internal surfaces parallel. Accordingly, one of them should always be turned 180° from this position. The emergent pencils are separated by an amount equal to the separation of the prism. If, therefore, the angular aperture of the telescope is 4°, or one in fourteen, the pencils will only overlap by three quarters if one prism is used, or by one half, with two prisms. This difficulty may be eliminated by fastening one prism in the focal plane.

3. It is difficult to measure stars whose distance apart is much less than 3″. If a high power is used, the working distance of the eyepiece is so small that the centre of the double image prism cannot be brought to the focal plane of the telescope, unless the field lens of the eyepiece is removed. This difficulty is best overcome by a double image prism of small angle, as a quarter of a degree. The emergent pencils will then overlap almost completely.

The results obtained from the various measures of double stars, made with these instruments, are given in Table I. The heading of each column is here prefixed to the description of it. The letter R refers to the Remarks beginning on page 178.

H.R. The number of the brighter component, or of both combined, in the Revised Harvard Photometry, H.A. 50.

DM. The number of the brighter star in the Zone of the Bonn Durchmusterung, when the position of the star in 1855 was north of declination −23°. For stars south of this limit, and whose declination in 1875 was north of −52°, the Cordoba Durchmusterung was used, and for stars south of −52°, the Cape Photographic Durchmusterung. As in other similar tables, Italics are used to indicate that, owing to precession, the zone differs by one from the degree of declination given in the fifth column.

Name. The usual name of the star.

R.A. The right ascension of the star, for 1900.

Dec. The declination of the star, for 1900.

Desig. The number of the star in "A General Catalogue of Double Stars," by S. W. Burnham, is given in this column, when the star is contained in that work, and, in general, when it is north of declination −31°. For other stars, south of declination −30°, the designation is that given in the "Reference Catalogue of Southern Doubles," compiled by R. T. A. Innes, and consists of the hour of right ascension, followed by a number. For other stars, the letter A denotes that the position in the next two columns is derived from the Argentine General Catalogue; B, from H.A. 14, 91, or 32, 299; C, from a manuscript list prepared by Professor G. C. Comstock.

P.A. The position angle in degrees and tenths, generally taken from Burnham's Catalogue, Volume I. The latest magnitude in Volume II is substituted when an approximate value only is given in Volume I. For positions taken from the Catalogue of Innes, the latest measure there given is inserted. For other stars, the authority given in the preceding column is employed.

Dist. The distance expressed in seconds and hundredths. The same rule is followed here, as for the position angle.

No. The number of sets of measures of the brightness, each set consisting of four settings. A letter is usually added which shows the authority for the measurement; a, denotes measures made with the 15-inch Equatorial, aperture 38 cm., described in H.A. 11, 103; b, measures made with the same instrument after reducing the aperture to 12.7 cm., as described in H.A. 11, 163; c, similar measures made with the 5-inch West Equatorial, as described in H.A. 11, 163; d, measures made with the 5-inch West Equatorial, as described in H.A. 14, 90; e, a series of measures, as yet unpublished, made by Professor O. C. Wendell, with the 15-inch East Equatorial; f, a series of measures, made in Arequipa with the 13-inch Boyden telescope, which are given in detail in Table III, page 183. When no letter is appended it indicates that the star was measured in two or more of these six series, and the result derived from each will then be found in Table II.

Diff. The difference in magnitude of the two components compared. The mean of the various measures is taken when all occur in one series. In other cases, the mean of the results in the different series is taken. This plan is preferred to that of giving weights proportional to the number of observations, which is equivalent to taking the mean of all the observations, since systematic errors are more to be feared than accidental errors. Negative values are indicated by Italics, and show that the object, assumed from the position angle to be the fainter, proved by measurement to be the brighter.

Corr. The difference in magnitude of the combined light of the two components, and that of the brighter component. This difference is found by the method described in H.A. 14, 90 and H.A. 33, 287, using the table contained in the latter work.

AB. The photometric magnitude of the combined light of the two components. Unless the distance apart is large, this is generally taken from the Revised Harvard Photometry, H.A. 50. For fainter stars, the mean of the magnitudes given in H.A. 54 is used. For stars which have not been measured photometrically the Durchmusterung magnitude, corresponding to the number contained in the second column, is given.

From an examination of the observations in H.A. 50, it appears that, in general, when the distance between two stars exceeded 40″ they were measured separately, when less than this amount the combined light only was determined. It has, accordingly, been assumed that, unless otherwise specified, the magnitude of a double star, measured with the 4-inch meridian photometer, is that of the brighter component only when the distance apart exceeds 40″, and of both combined when this distance is less than 40″. For example, the photometric magnitude, 7.07, for the second star in Table I is assumed to be that of the brighter component, while that of the third star, 6.40, is assumed to represent the combined light. When both components are measured with the meridian photometer, the combined light is computed and adopted for the value of AB.

A. The magnitude of the brighter component, found by adding the numbers in the two preceding columns, headed Corr. and AB.

B. The magnitude of the fainter component, found by adding the numbers in the columns headed Diff. and A.

It occasionally happens that the magnitudes in the last three columns of Table I differ by a small amount from those given in the Revised Harvard Photometry. This is generally due to later observations which have been included in the present work. The average difference, however, is much less than a tenth of a magnitude. In the case of multiple stars there may be a difference of opinion as to the best method of determining the magnitudes of the components. The observed difference in magnitude given in the column headed Diff. may then be employed. The values given are generally taken from H. A. **50**.

TABLE I.

CATALOGUE OF DOUBLE STARS.

H. R.	DM.	Name.	R.A. 1900.	Dec. 1900.	Desig.	P.A.	Dist.	No.	Diff.	Corr.	AB.	A.	B.
			h. m.	° ′		°	″						
15	4	α Andromedae	0 3.2	+28 32	19	266.8	65.0	10a	8.27	.00	2.15	2.15	10.42
"	"	"	"	"	"	"	"	R	8.23	.00	"	"	10.38
..	42	– Andromedae	14.8	+37 41	144	13.2	45.74	4e	3.21	.06	7.01	7.07	10.28
86	42	42 Piscium	17.2	+12 57	165	344.0	31.67	4e	4.42	.02	6.40	6.42	10.84
..	69	49 Piscium	25.6	+15 28	248	107.9	13.67	4e	3.54	.04	6.94	6.98	10.52
127	50	β^2 Tucanae	27.0	–63 31	0^{h} 27	350.4	27.32	12f	0.08	.71	3.75	4.46	4.54
132	64	51 Piscium	27.3	+ 6 25	274	82.3	27.4	28	3.61	.04	5.66	5.70	9.31
..	170	– Sculptoris	28.8	–35 32	0^{h} 29	165.4	6.03	12f	1.52	.24	6.57	6.81	8.33
..	*103*	– Phoenicis	28.8	–55 53	0^{h} 28	246.4	6.50	12f	2.28	.13	7.52	7.65	9.93
..	105	– Andromedae	30.7	+29 27	322	35.3	5.32	4e	3.68	.04	8.03	8.34	12.02
154	*101*	π Andromedae	31.5	+33 10	329	175.4	36.0	22	4.26	.02	4.44	4.46	8.72
166	85	54 Piscium	34.2	+20 43	C	93	120	4e	5.16	.01	6.07	6.08	11.24
167	87	55 Piscium	34.6	+20 54	360	192.7	6.4	25	3.24	.05	5.57	5.62	8.86
168	139	α Cassiopeiae	34.8	+55 59	361	280.2	64.15	36	6.50	.00	2.47	2.47	8.97
..	113	– Andromedae	41.0	+30 24	415	55.4	46.42	14e	0.11	.70	6.73	7.43	7.54
219	150	η Cassiopeiae	43.0	+57 17	426	92.1	9.39	22	3.74	.03	3.64	3.67	7.41
231	*131*	ι Piscium	44.5	+27 10	439	299.0	4.45	8e	0.00	.75	5.54	6.29	6.29
252	37	λ Tucanae .	48.6	–70 3	0^{h} 52	79.1	20.5	12f	0.46	.55	6.59	7.14	7.60
269	175	μ Andromedae	51.2	+37 57	497	116.9	38.37	4e	7.35	.00	3.94	3.94	11.29
..	159	– Ceti	54.3	+ 0 15	519	300.1	18.26	12e	0.90	.39	7.78	8.17	9.07
283	193	– Andromedae	54.4	+44 10	520	192.4	7.62	16e	0.80	.42	5.62	6.04	6.84
..	72	– Tucanae	59.2	–60 38	0^{h} 63	126.2	4.74	12f	0.27	.63	7.0	7.63	7.90
310	156	ψ^1 Piscium	1 0.4	+20 56	570	160.3	29.90	30	0.22	.65	4.92	5.57	5.79
..	180	– Piscium	0.7	+31 39	573	285.5	48.13	4e	4.30	.02	6.62	6.64	10.94
313	175	77 Piscium	0.7	+ 4 22	574	82.7	32.84	20e	0.89	.40	6.35	6.75	7.64
321	223	μ Cassiopeiae	1.6	+54 26	C	21.2	18.4	8e	5.98	.00	5.26	5.26	11.24
330	*190*	e Piscium	3.2	+ 5 7	C	12.9	160	8e	5.36	.01	5.66	5.67	11.03
343	236	θ Cassiopeiae	5.0	+54 37	C	13.4	146	4e	6.67	.00	4.52	4.52	11.19
360	*158*	φ Piscium	8.3	+24 3	647	227.5	7.98	13a	5.07	.01	4.64	4.65	9.72
361	*174*	ζ Piscium	8.5	+ 7 3	648	63.7	23.46	28	0.92	.39	5.18	5.57	6.49
366	216	37 Ceti	9.4	– 8 28	655	331.4	50.12	26e	2.57	.10	5.11	5.21	7.78
377	45	κ Tucanae	12.4	–69 24	1^{h} 14	354.8	5.52	12f	2.19	.14	4.96	5.10	7.29
..	555	– Ceti	18.8	–24 52	738	83.5	2.93	4f	1.86	18	6.66	6.84	8.70
399	123	ψ Cassiopeiae	18.9	+67 36	732	103	31	45	4.61	.02	4.96	4.98	9.59
"	"	"	"	" "	"	101.8	32.22	6a	5.36	.01	"	"	10.34
"	"	"	"	" "	"	104.6	29.3	2a	5.92	.00	"	"	10.90
..	112	– Hydri	21.5	–60 1	A	2.3	24.3	4f	1.83	.18	6.98	7.16	8.99
..	229	– Ceti	21.9	– 0 40	761	33.3	16.91	4e	2.35	.12	7.8	7.92	10.27
..	478	– Sculptoris	22.5	–30 45	766	125.8	10.15	12f	2.90	.07	6.84	6.91	9.81
424	8	α Ursae Minoris	22.6	+88 46	713	210.1	18.27	36	6.67	.00	2.12	2.12	8.79
434	194	μ Piscium	24.9	+ 5 38	C	301	181	8e	7.28	.00	5.12	5.12	12.40
..	*271*	– Cassiopeiae	26.6	+60 10	792	142.4	13.64	4e	2.36	.12	7.26	7.38	9.74
..	167	– Piscium	26.6	+16 28	794	5.4	24.25	4e	3.05	.06	6.81	6.87	9.92
458	332	υ Andromedae	30.9	+40 54	C	282	280	8e	5.78	.00	4.18	4.18	9.96
462	540	τ Sculptoris	31.6	–30 25	836	97.0	1.80	12f	1.12	.33	5.68	6.01	7.13
..	253	– Piscium	34.5	+14 45	860	313.1	25.29	4e	0.17	.67	8.25	8.92	9.07

H. R.	DM.	Name.	R.A. 1900.		Dec. 1900.		Desig.	P.A.	Dist.	No.	Diff.	Corr.	AB.	A.	B.
			h.	m.	°	′		°	″						
479	*358*	– Eridani	1	35.0	–53	56	A	106.9	11.0	12f	1.05	.35	7.14	7.49	8.54
..	*573*	– Sculptoris		35.3	–37	58	A	278.3	20.8	12f	1.12	.33	6.99	7.32	8.44
484	276	– Piscium		35.7	+25	14	870	31.6	11.28	8e	4.21	.02	6.26	6.28	10.49
487	329	ρ Eridani		36.0	–56	42	1^{h} 37	223.4	7.40	16f	0.06	.72	5.26	5.98	6.04
493	279	107 Piscium		37.1	+19	47	882	222.5	38.48	4e	6.18	.00	5.32	5.32	11.50
546	243	ν Arietis		48.0	+18	49	993	0.0	8.63	26	0.08	.71	4.04	4.75	4.83
557	355	56 Andromedae		50.2	+36	46	1008	302.3	177.53	24e	0.16	.68	5.18	5.84	6.00
..	162	– Hydri		52.1	–60	48	1^{h} 56	47.9	1.97	4f	0.04	.73	6.55	7.28	7.32
569	*288*	λ Arietis		52.4	+23	7	1028	48.0	36.62	26	2.51	.10	4.83	4.93	7.44
596	317	α Piscium		56.9	+ 2	17	1061	335.7	3.64	13a	0.90	.39	3.94	4.33	5.23
603	395	γ Andromedae		57.8	+41	51	1070	62.4	10.33	26	2.80	.08	2.20	2.28	5.08
628	425	59 Andromedae	2	4.8	+38	34	1125	34.8	16.48	4e	0.66	.47	5.58	6.05	6.71
642	371	6 Trianguli		6.6	+29	50	1137	80.5	3.68	12a	1.56	.23	5.20	5.43	6.99
645	481	6 Persei		7.0	+50	36	1141	75.8	146.58	4e	4.98	.01	5.39	5.40	10.38
650	*336*	66 Ceti		7.7	– 2	52	1149	228.9	15.54	18e	1.89	.18	5.72	5.90	7.79
707	213	ι Cassiopeiae		20.8	+66	57	1262	276.7	1.86	10a	2.26	.13	4.59	4.77	7.03
"	"	"		"	"	"	"	107.3	7.63	11a	3.43	.05	"	"	8.20
748	519	– Persei		29.4	+36	53	1320	71.2	16.95	4e	5.02	.01	5.93	5.94	10.96
749	819	ω Fornacis		29.5	–28	40	1322	244.4	10.54	22	2.71	.09	4.95	5.04	7.75
754	*418*	ν Ceti		30.6	+ 5	9	1328	83.3	7.72	27	4.68	.01	5.02	5.03	9.71
765	376	30 Arietis		31.3	+24	13	1332	273.0	38.56	4d	0.70	.46	6.11	6.57	7.27
782	443	33 Arietis		34.8	+26	38	1364	359.4	28.54	30e	3.85	.03	5.38	5.41	9.26
..	206	– Horologii		37.0	–60	0	A	37.0	3.5	4f	0.12	.69	7.22	7.91	8.03
799	746	θ Persei		37.4	+48	48	1393	294.6	15.40	26	5.63	.01	4.22	4.23	9.86
"	"	"		"	"	"	C	224	73	4e	7.25	.00	"	"	11.48
804	422	ν Ceti		38.1	+ 2	49	1401	289.2	2.67	35a	2.47	.11	3.58	3.69	6.16
814	*769*	– Eridani		39.5	–40	58	2^{h} 28	43.6	1.41	8f	0.22	.65	6.34	6.99	7.21
834	714	η Persei		43.4	+55	29	1440	300.4	28.42	36	4.77	.01	3.93	3.94	8.71
836	*355*	π Arietis		43.7	+17	3	1448	119.3	3.28	12a	2.91	.07	5.30	5.37	8.28
"	"	"		"	"	"	"	110.1	25.22	13a	5.79	.01	"	"	11.16
838	471	41 Arietis		44.1	+26	51	1450	226.6	127.55	26	5.22	.01	3.67	3.68	8.90
"	"	"		"	"	"	"	203.0	34.45	4e	7.32	.00	"	"	11.00
840	646	16 Persei		44.2	+37	55	C	145	25.3	4e	6.10	.00	4.27	4.27	10.37
..	1053	– Fornacis		44.6	–37	49	2^{h} 37	144.8	5.29	4f	1.14	.33	6.72	7.05	8.19
855	655	20 Persei		47.4	+37	56	1471	236.8	14.08	10e	3.99	.03	5.32	5.35	9.34
890	665	– Persei		53.7	+51	57	1510	85.0	12.19	18e	1.37	.27	5.15	5.42	6.79
897	771	θ Eridani		54.5	–40	42	2^{h} 50	84.5	8.51	23	1.00	.36	3.06	3.42	4.42
..	704	– Horologii	3	1.4	–51	43	A	70.1	38.2	4f	1.56	.23	7.53	7.76	9.32
..	*486*	– Ceti		4.4	+ 7	8	1583	162.6	80.98	8e	0.17	.67	7.64	8.31	8.48
996	*518*	κ Ceti		14.1	+ 3	0	C	157	269	12e	3.88	.03	4.93	4.96	8.84
1035	660	– Camelopardalis		21.0	+59	36	1708	161.4	2.36	14a	4.09	.02	4.22	4.24	8.33
1046	*684*	– Camelopardalis		22.4	+55	7	1711	159.6	15.03	26	4.54	.02	4.98	5.00	9.54
1065	515	– Tauri		25.3	+27	14	1733	270.0	11.12	22e	0.31	.61	5.93	6.54	6.85
1086	*473*	7 Tauri		28.5	+24	7	1761	63.0	22.41	4e	3.68	.04	5.92	5.96	9.64
1099	616	– Tauri		31.7	+ 0	16	1787	232.2	6.13	12e	2.72	.09	6.12	6.21	8.93
..	571	– Tauri		35.3	+ 4	49	1814	55.3	26.57	12e	3.22	.05	6.73	6.78	10.00
1123	698	ο Persei		36.0	+33	39	1818	237.2	20.01	26	4.90	.01	5.04	5.05	9.95
..	1027	– Eridani		36.2	–40	40	3^{h} 37	327.1	7.83	4f	0.79	.43	6.96	7.39	8.18
..	262	– Reticuli		36.2	–60	6	A	270.9	56.5	4f	1.32	.28	6.82	7.10	8.42
1165	541	η Tauri		41.5	+23	48	1875	289.3	117.16	38	3.29	.05	2.91	2.96	6.25

H. R.	DM.	Name	R.A. 1900.		Dec. 1900.		Desig.	P.A.	Dist.	No.	Diff.	Corr.	AB.	A.	B.
			h.	m.	°	′		°	″						
1174	486	e Tauri	3	42.8	+10	50	1886	57.9	8.90	26	4.08	.03	5.03	5.06	9.14
1190	*1297*	f Eridani		44.9	−37	55	3^h 44	206.7	7.81	28	0.56	.51	4.35	4.86	5.42
1203	666	ζ Persei		47.8	+31	35	1921	207.6	12.48	18	6.39	.00	2.91	2.91	9.30
1212	631	w Eridani		49.2	− 3	14	1939	347.3	6.70	22	1.38	.27	4.68	4.95	6.33
1220	895	ε Persei		51.1	+39	43	1950	9.2	8.81	26	4.96	.01	2.96	2.97	7.93
..	1148	− Eridani		53.1	−40	13	3^h 55	143.4	3.95	12f	0.75	.44	7.74	8.18	8.93
..	617	− Reticuli		58.6	−54	41	3^h 61	87	2.5	8f	0.32	.60	7.54	8.14	8.46
1256	585	A^1 Tauri		58.8	+21	49	C	189	138	4e	5.32	.01	4.49	4.50	9.82
1258	769	− Eridani		59.1	−20	26	B	104	1.74	4d	1.00	.36	6.03	6.39	7.39
1260	*676*	− Camelopardalis		59.1	+62	4	2014	303.3	17.98	24e	0.03	.74	6.30	7.04	7.07
1262	587	A^2 Tauri		59.4	+21	44	C	3	169	4e	1.94	.17	5.79	5.96	7.90
..	878	− Persei	4	1.0	+37	49	2027	147.9	3.30	4e	1.29	.29	6.81	7.10	8.39
1318	867	A Eridani		9.6	−10	30	2102	153.7	6.26	10a	3.74	.03	5.13	5.16	8.90
1322	614	− Tauri		10.2	+ 5	57	2106	318.8	62.57	4d	0.48	.54	6.05	6.59	7.07
1325	780	o^2 Eridani		10.7	− 7	49	2109	107.2	83.48	26	5.00	.01	4.47	4.48	9.48
1348	655	φ Tauri		14.2	+27	7	C	248	52	4e	3.42	.05	5.01	5.06	8.48
1364	1503	− Horologii		16.1	−44	30	A	115.0	71.0	8f	3.48	.04	5.08	5.12	8.60
1369	707	χ Tauri		16.5	+25	23	2147	25.3	19.30	26e	2.80	.08	5.38	5.46	8.26
..	*851*	− Persei		17.9	+34	5	2160	60.3	19.53	28e	1.16	.32	6.95	7.27	8.43
1387	*642*	κ Tauri		19.4	+22	4	2177	172.6	339.28	12e	0.93	.38	4.01	4.39	5.32
1405	659	− Doradus		22.3	−57	17	4^h 27	236.0	5.43	12f	0.30	.61	6.54	7.15	7.45
1406	665	− Tauri		22.5	+30	9	2210	35.9	14.20	16e	1.68	.21	6.26	6.47	8.15
1412	632	θ^2 Tauri		22.8	+15	44	2212	346.2	337.39	20e	0.47	.54	3.06	3.60	4.07
1417	779	1 Camelopardalis		24.1	+53	42	2220	307.1	10.13	18e	0.75	.44	5.42	5.86	6.61
1424	1013	− Persei		24.6	+39	48	2229	114.4	8.96	18e	0.37	.58	6.26	6.84	7.21
..	172	− Mensae		29.3	−77	54	A	58.0	10.9	12f	0.14	.68	7.5	8.18	8.32
1458	607	d Tauri		30.2	+ 9	57	2267	299.0	69.45	18	3.30	.05	4.33	4.38	7.68
1457	629	α Tauri		30.2	+16	19	2266	36.0	109.04	11a	9.53	.00	1.06	1.06	10.59
1460	*959*	− Eridani		30.5	− 9	57	2269	258.9	12.77	12e	0.97	.37	6.32	6.69	7.66
1475	342	− Reticuli		32.6	−63	2	A	96.3	30.9	8f	3.50	.04	5.86	5.90	9.40
1497	739	τ Tauri		36.2	+22	46	2313	211.5	62.82	23	2.84	.08	4.25	4.33	7.17
..	1521	− Caeli		37.4	−40	3	A	355.3	33.4	8f	0.32	.60	7.85	8.45	8.77
1506	*969*	55 Eridani		38.8	− 8	59	2330	318.3	9.13	16e	0.08	.71	5.96	6.67	6.75
..	1476	− Pictoris		41.1	−50	4	A	227.1	70.2	4f	0.88	.40	8.03	8.43	9.31
1543	762	π^3 Orionis		44.4	+ 6	47	C	137	96	4e	7.70	.00	3.31	3.31	11.01
1563	760	ι Pictoris		48.7	−53	38	4^h 58	58.4	121	12f	0.67	.47	5.19	5.66	6.33
1568	829	7 Camelopardalis		49.3	+53	35	2406	238.3	25.65	10a	6.21	.00	4.44	4.44	10.65
1592	1005	4 Aurigae		52.5	+37	44	2435	351.9	6.46	22	2.67	.09	4.99	5.08	7.75
1610	737	− Orionis		55.3	+ 3	28	2467	260.3	21.31	22e	0.32	.60	6.03	6.63	6.95
..	775	− Tauri		55.6	+26	32	2468	158.6	78.56	26e	1.28	.29	6.57	6.86	8.14
1622	804	11 Camelopardalis		57.4	+58	52	2480	7.1	181.32	26	0.72	.45	4.96	5.41	6.13
1662	736	13 Orionis	5	2.2	+ 9	21	C	268	403	4e	1.90	.00	6.21	6.26	8.16
“	“	“		“	“	“	“	264	124	4e	3.43	.05	“	“	9.69
1686	169	− Camelopardalis		6.1	+79	7	2548	348.6	34.04	39	3.55	.04	5.16	5.20	8.75
1696	*1095*	ι Leporis		7.7	−11	59	2581	337.6	12.81	20	5.01	.01	4.54	4.55	9.56
1698	888	ρ Orionis		8.1	+ 2	45	2584	63.5	7.05	24	3.80	.03	4.64	4.67	8.47
1705	1092	κ Leporis		8.7	−13	3	2594	358.7	3.05	8a	2.63	.09	4.46	4.55	7.18
1706	922	14 Aurigae		8.8	+32	35	2591	225.6	14.65	28	2.89	.07	5.14	5.21	8.10
1713	1063	β Orionis		9.7	− 8	19	2605	199.8	9.14	24	6.32	.00	0.34	0.34	6·66
..	2135	− Columbae		11.6	−36	46	A	287.0	23.2	8f	1.70	.21	6.64	6.85	8.55

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1729	*1248*	λ Aurigae	5	12.1	+40	1	2630	215.9	35.25	20e	4.83	.01	4.85	4.86	9.69
1770	871	m Orionis		17.6	+ 3	27	2692	28.1	31.71	30	2.11	.15	4.99	5.14	7.25
1771	3023	– Leporis		17.7	–24	52	2695	110.3	3.33	8e	1.22	.31	5.14	5.45	6.67
1780	920	111 Tauri		18.6	+17	17	2703	271.3	61.76	4e	3.42	.05	5.09	5.14	8.56
1821	839	118 Tauri		23.1	+25	4	2751	196.8	4.89	12e	0.77	.43	5.44	5.87	6.64
1847	794	– Tauri		26.4	+16	59	2789	141.8	9.81	14e	0.37	.58	5.49	6.07	6.44
1852	983	δ Orionis		26.9	– 0	23	2796	359.2	52.74	42	4.39	.02	2.46	2.48	6.87
1879	879	λ Orionis		29.6	+ 9	52	2821	40.3	4.24	18	1.90	.17	3.49	3.66	5.56
"	"	"		"	"	"	"	182.6	28.13	12a	7.17	.00	"	"	10.83
1895	1315	θ¹ Orionis		30.4	– 5	27	2837	240.3	13.34	8a	1.46	.25	4.85	5.36	6.84
"	"	"		"	"	"	"	299.4	19.23	9a	1.47	.25	"	"	6.85
"	"	"		"	"	"	"	162.1	16.85	8a	2.62	.09	"	"	7.93
1893	"	"		"	"	"	"	95.4	21.41	8a	0.15	.68	"	6.84	6.85
"	"	"		"	"	"	"	131.5	13.00	8a	0.92	.39	"	6.84	7.93
1896	"	"		"	"	"	"	31.6	8.71	8a	1.22	.31	"	6.85	"
1897	1319	θ² Orionis		30.5	– 5	29	2839	92.0	52.78	28	1.36	.27	4.90	5.17	6.53
1899	*1241*	ι Orionis		30.5	– 5	59	2843	142.2	11.32	24	4.44	.02	2.87	2.89	7.33
1914	963	26 Aurigae		32.2	+30	26	2857	268.0	12.34	28	2.97	.07	5.49	5.56	8.53
1931	1326	σ Orionis		33.7	– 2	39	2883	60.9	41.64	22	2.73	.08	3.62	3.78	6.51
"	"	"		"	"	"	"	84.5	12.86	26	2.88	.07	"	"	6.66
"	"	"		"	"	"	"	236.5	11.00	10a	5.34	.01	"	"	9.12
"	"	"		"	"	"	"	60.0	52.61	12e	2.29	.12	"	9.12	11.41
1945	953	– Aurigae		35.0	+29	26	2887	13.8	25.85	24e	0.68	.46	6.29	6.75	7.43
1948	1338	ζ Orionis		35.7	– 2	0	2902	151.3	2.55	11a	2.16	.14	1.91	2.05	4.21
"	"	"		"	"	"	"	9.0	57.67	4a	7.88	.00	"	"	9.93
1983	1211	γ Leporis		40.3	–22	29	2948	349.4	93.84	16	2.40	.12	3.71	3.83	6.23
2067	1036	– Orionis		50.3	+13	56	C	330	12	4e	1.70	.21	6.48	6.69	8.39
2095	1380	θ Aurigae		52.9	+37	12	3074	352.3	125.05	4e	7.37	.00	2.71	2.71	10.08
2174	1139	– Orionis	6	3.8	+ 2	31	3185	113.2	29.29	18e	1.14	.33	5.58	5.91	7.05
2176	1352	41 Aurigae		3.9	+48	44	3181	353.1	8.00	16e	0.72	.45	5.64	6.09	6.82
2217	1388	– Aurigae		8.9	+36	12	3238	217.4	11.03	14e	0.55	.51	6.42	6.93	7.48
. .	2854	– Columbae		17.6	–35	5	A	108.8	26.1	12f	0.94	.38	8.20	8.58	9.52
2298	1236	8 Monocerotis		18.5	+ 4	39	3349	25.9	13.86	26	2.06	.15	4.33	4.48	6.54
. .	1427	– Geminorum		21.8	+20	52	C	204	29	4e	1.36	.27	6.55	6.82	8.18
2331	932	6 Lyncis		22.1	+58	14	C	117	180	4e	3.42	.05	5.91	5.96	9.38
2356	1574	β Monocerotis		24.0	– 6	58	3402	130.0	7.25	12a	0.49	.53	3.94	4.73	5.22
"	"	"		"	"		"	126.0	8.35	8e	0.02	.74	"	"	4.68
2358	1575	"		"	"		"	101.7	2.46	11a	0.38	.58	"	5.22	5.60
2370	1204	– Monocerotis		25.6	+11	19	3427	3.8	16.28	8e	2.80	.08	5.83	5.91	8.71
. .	2486	– Columbae		25.9	–40	18	A	112.1	70.0	12f	0.41	.57	6.78	7.35	7.76
. .	1286	20 Geminorum		26.5	+17	51	3435	209.8	20.01	18e	0.54	.52	6.72	7.24	7.78
2384	2241	– Puppis		27.3	–50	10	6^h 36	315.6	13.2	28f	3.01	.07	5.32	5.39	8.40
2394	893	8 Lyncis		28.6	+61	34	C	94	37.4	4e	1.10	.34	5.62	6.05	7.15
"	"	"		"	"	"	"	80	156	4e	2.60	.09	"	"	8.65
. .	1696	– Aurigae		37.3	+40	44	3562	136.6	30.40	4e	2.24	.13	6.87	7.00	9.24
2473	1406	ε Geminorum		37.8	+25	14	3568	93.7	111.58	26	6.02	.00	3.18	3.18	9.20
2483	1595	ψ⁵ Aurigae		39.5	+43	41	C	24	44	4e	3.01	.07	5.27	5.34	8.35
2486	1122	– Lyncis		39.9	+55	49	3587	256.7	5.07	12e	0.05	.73	5.55	6.33	6.28
2491	1591	α Canis Majoris		40.7	–16	35	3596	84.6	10.07	13a	10.02	.00	*1.58*	*1.58*	8.44
2560	982	15 Lyncis		48.6	+58	33	C	167	200	4e	6.18	.00	4.54	4.54	10.72

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2564	1462	e Geminorum	6	49.0	+13	18	3692	174.9	5.73	16e	2.71	.09	4.70	4.79	7.50
2593	1741	μ Canis Majoris		51.5	−13	55	3725	343.5	3.22	9a	2.32	.12	5.19	5.31	7.63
. .	*4639*	– Canis Majoris		53.0	−25	1	3727	97.6	3.80	4f	1.78	.19	8.30	8.49	10.27
2640	3911	– Canis Majoris		57.0	−25	4	A	112.0	130.7	8e	3.73	.03	5.77	5.80	9.53
2667	2906	– Puppis	7	0.9	−43	28	B	121.0	20.4	12f	1.12	.33	5.47	5.80	6.92
. .	2919	– Puppis		2.4	−45	10	A	234.6	57.1	8f	1.15	.32	8.82	9.14	10.29
2736	600	γ Volantis		9.6	−70	20	7^h 16	299.7	13.3	52f	1.94	.17	3.70	3.87	5.81
. .	*3247*	– Puppis		12.2	−45	0	A	50.2	63.4	8f	*0.17*	.67	8.93	9.60	9.77
2763	1443	λ Geminorum		12.3	+16	43	3951	30.9	9.56	16	6.10	.00	3.65	3.65	9.75
2777	1645	δ Geminorum		14.2	+22	10	3970	196.9	7.14	16e	4.51	.02	3.51	3.53	8.04
. .	1420	20 Lyncis		14.6	+50	20	3974	253.4	15.03	14e	*0.10*	.70	6.62	7.32	7.42
2784	1192	19 Lyncis		14.7	+55	28	3973	313.8	14.72	22e	0.92	.39	5.22	5.61	6.53
2813	1153	– Carinae		17.9	−52	8	7^h 32	20.3	9.4	28f	0.63	.48	5.88	6.36	6.99
. .	4336	– Canis Majoris		20.4	−29	57	4053	20.3	1.90	12f	1.07	.35	8.30	8.65	9.72
2843	3549	– Puppis		21.3	−37	6	7^h 41	141.8	6.96	20f	0.08	.71	6.28	6.99	7.07
2870	4590	– Puppis		25.1	−31	38	B	51.8	9.5	24	0.73	.45	6.06	6.51	7.24
2891	1581	α Geminorum		28.2	+32	6	4122	262.5	4.40	42	0.86	.41	1.58	1.99	2.85
"	"	"		"	"	"	"	162.5	72.54	28	7.04	.00	"	"	9.03
2909	5709	n Puppis		30.1	−23	15	4147	284.9	9.01	8e	0.15	.68	5.18	5.86	6.01
2948	4707	k Puppis		34.7	−26	34	4197	317.8	10.41	22	0.12	.69	3.81	4.50	4.62
2979	*457*	– Volantis		37.4	−74	3	7^h 65	105.6	2.09	12f	0.02	.74	6.46	7.20	7.22
. .	4805	– Puppis		38.2	−29	57	A	251.3	184.6	12f	2.40	.11	6.76	6.87	9.27
2985	1759	κ Geminorum		38.4	+24	38	4226	233.2	6.24	10a	5.69	.01	3.68	3.69	9.38
. .	*4868*	– Puppis		40.4	−30	1	A	229.3	54.4	12f	1.69	.21	7.49	7.70	9.39
3010	2194	– Puppis		40.9	−14	27	4250	339.2	16.53	16e	.74	.44	5.62	6.06	6.80
3013	1585	π Geminorum		41.1	+33	40	4249	211.7	22.60	18	5.56	.01	5.29	5.30	10.86
3026	2049	– Puppis		43.1	−15	44	A	310.7	128.9	12e	*0.06*	.72	5.99	6.71	6.77
. .	5218	– Puppis		48.7	−30	13	A	38.6	10.6	12f	0.41	.57	8.50	9.07	9.48
. .	5302	– Puppis		52.4	−25	9	A	72.1	86.7	12f	1.61	.22	7.63	7.85	9.46
3142	3243	– Puppis		56.4	−49	42	B	46.9	17.4	32f	0.13	.69	5.78	6.47	6.60
3174	2222	– Monocerotis	8	1.6	− 8	57	4440	326.3	30.97	20e	1.50	.24	5.92	6.16	7.66
. .	3741	– Velorum		2.0	−45	7	A	16.1	26.4	12f	0.36	.59	7.80	8.39	8.75
. .	*3991*	– Puppis		2.8	−40	3	A	242.4	52.0	12f	0.36	.59	7.41	8.00	8.36
3188	2450	ζ Monocerotis		3.6	− 2	41	4456	244.4	67.06	4e	4.22	.02	4.39	4.41	8.63
"	"	"		"	"	"	"	104.2	31.58	4e	5.24	.01	"	"	"
. .	3169	– Velorum		4.9	−50	10	A	58.7	24.4	12f	0.47	.54	9.53	10.07	10.54
. .	1695	– Lyncis		5.5	+32	47	C	76	223	4e	3.72	.03	6.91	6.95	10.67
. .	"	"		"	"	"	"	318	53	4e	4.70	.01	"	"	11.65
3208	*1867*	ζ Cancri		6.5	+17	56	4477	154.7	5.30	24	0.92	.39	4.71	5.10	5.95
3207	*3847*	γ Velorum		6.5	−47	2	8^h 14	219.4	42.9	4f	2.10	.15	2.12	2.27	4.37
. .	1154	– Ursae Majoris		8.8	+59	30	C	8	96	4e	2.72	.09	6.61	6.70	9.42
3236	409	– Camelopardalis		9.6	+72	43	4501	85.2	44.37	40e	3.56	.04	6.16	6.20	9.76
3240	*4358*	– Puppis		10.2	−36	1	A	174.6	66.4	20	1.00	.36	4.70	5.06	6.06
3242	4365	– Puppis		10.4	−35	11	A	248.7	140.5	8f	4.56	.02	5.82	5.84	10.40
3266	4452	– Puppis		14.5	−35	9	A	187.2	87.8	20f	4.06	.03	5.65	5.68	9.74
3287	1859	– Lyncis		18.0	+42	20	C	170	78	12e	2.06	.15	6.07	6.22	8.28
3311	1612	ϕ^2 Cancri		20.7	+27	16	4601	212.0	4.56	8e	0.02	.74	5.56	6.30	6.32
3312	*1920*	24 Cancri		20.7	+24	52	4602	37.3	5.84	8e	0.54	.52	6.58	7.10	7.64
3327	4462	– Puppis		22.6	−38	44	8^h 42	122.4	7.87	12f	0.60	.49	6.19	6.68	7.28
3359	4462	– Velorum		26.0	−44	23	8^h 44	348.6	4.71	4f	1.44	.26	5.06	5.22	6.66

H. R.	DM.	Name.	R.A. 1900.		Dec. 1900.		Desig.	P.A.	Dist.	No.	Diff.	Corr.	AB.	A.	B.
			h.	m.	°	′		°	″						
3395	*1997*	– Hydrae	8	30.5	+ 6	58	4677	25.4	10.33	22e	1.11	.33	5.71	6.04	7.15
3475	1824	ι Cancri		40.6	+29	8	4763	307.1	30.46	34	2.41	.11	4.09	4.20	6.61
3482	2636	ε Hydrae		41.5	+ 6	47	4771	195.6	3.20	10a	3.24	.05	3.48	3.53	6.77
3553	2661	17 Hydrae		50.6	– 7	36	4859	358.8	4.33	8e	0.24	.64	6.03	6.67	6.91
3569	1707	ι Ursae Majoris		52.4	+48	26	4866	351.8	10.70	4a	7.07	.00	3.12	3.12	10.19
3579	1956	10 Ursae Majoris		54.2	+42	11	C	109	222	4e	0.71	.45	3.64	4.09	4.80
“	“	“ “		“	“	“	“	200	132	4e	6.32	.00	“	“	10.41
3582	1301	b¹ Carinae		54.5	–58	51	A	73.6	40.0	4f	1.67	.21	5.08	5.29	6.96
3616	577	σ² Ursae Majoris	9	1.6	+67	32	4923	263.5	4.58	11a	3.28	.05	4.87	4.92	8.20
3626	1715	75 Cancri		3.0	+27	3	C	39	110	8e	3.99	.03	5.93	5.96	9.95
3644	7194	ε Pyxidis		5.7	–29	57	4963	157.1	17.71	28	4.28	.02	5.56	5.58	9.86
..	2063	– Leonis		9.4	+23	47	C	82	60	4e	1.38	.27	7.87	8.14	9.52
3690	1965	38 Lyncis		12.6	+37	14	5014	240.2	2.70	12a	1.85	.18	3.82	4.00	5.85
3705	*1979*	40 Lyncis		15.0	+34	49	C	32	215	4e	1.78	.19	3.10	3.30	5.08
“	“	“		“	“	“	“	36	210	4e	5.62	.01	“	“	8.92
3743	1509	– Ursae Majoris		22.1	+46	2	5090	161.5	86.65	8e	2.24	.13	5.42	5.56	7.80
“	“	“ “		“	“	“	C	79	83	4e	5.22	.01	“	“	10.78
3757	845	h Ursae Majoris		23.7	+63	30	5104	272.4	22.81	32	5.34	.01	3.75	3.76	9.10
..	*5503*	– Velorum		24.8	–45	3	A	97.8	60.0	12f	0.50	.53	6.65	7.18	7.68
3779	2014	h Leonis		26.5	+10	9	C	74	37	8e	4.06	.03	5.28	5.31	9.37
3781	7355	ζ¹ Antliae		26.5	–31	27	9^h 39	210.5	8.47	39	0.86	.41	5.94	6.35	7.21
3818	*2077*	7 Leonis		30.5	+14	49	C	80	41	4e	3.34	.05	6.16	6.21	9.55
..	*4963*	– Velorum		41.4	–49	2	A	67.6	18.4	12f	0.01	.75	7.25	8.00	8.01
3890	1084	υ Carinae		44.6	–64	36	9^h 66	125.4	4.94	8f	2.88	.07	3.08	3.15	6.03
..	7933	– Antliae		45.3	–30	16	A	80.6	63.7	12f	0.36	.59	8.61	9.20	9.56
..	210	– Octantis		45.7	–85	33	A	268.2	16.4	24f	0.62	.49	6.94	7.43	8.05
3898	5470	u Velorum		46.1	–45	16	A	45.7	65.9	19f	3.60	.04	5.22	5.26	8.86
..	2248	– Sextantis		48.9	+ 5	25	C	290	52	8e	1.66	.21	6.77	6.98	8.64
3925	5987	– Velorum		50.4	–44	49	9^h 71	238.6	5.55	8f	2.13	.14	5.75	5.89	8.02
..	6013	– Antliae		50.7	–35	9	A	280.3	51.9	12f	0.63	.48	7.91	8.39	9.02
3982	2149	α Leonis	10	3.0	+12	27	5331	306.6	176.90	50	6.30	.00	1.34	1.34	7.64
4021	534	– Ursae Majoris		9.8	+71	34	5356	167.1	16.73	16e	0.62	.49	6.09	6.58	7.20
4031	*2209*	ζ Leonis		11.1	+23	55	5368	343.1	314.44	10c	2.05	.15	3.52	3.67	5.72
4057	2467	γ Leonis		14.5	+20	21	5388	103.4	2.50	10a	1.19	.31	2.30	2.61	3.80
“	“	“		“	“	“	C	291	252	4e	7.69	.00	“	2.30	9.99
“	“	“		“	“	“	“	302	333	4e	8.28	.00	“	“	10.58
4074	3286	J Velorum		17.2	–55	33	10^h 31	201.3	37.0	12f	3.39	.05	4.65	4.71	8.10
“	“	“		“	“	“	A	105.2	7.20	12f	4.78	.01	“	“	9.49
..	8402	– Antliae		18.0	–30	10	A	347.2	32.7	12f	1.51	.24	8.20	8.45	9.96
4079	2301	– Leonis		18.1	+ 6	12	C	348	58	4e	3.70	.04	6.46	6.50	10.20
4118	*8383*	δ Antliae		25.0	–30	5	5453	225.4	10.62	20	3.80	.03	5.65	5.68	9.48
4134	3909	– Velorum		27.5	–53	13	10^h 44	71.7	23.4	8f	3.36	.05	5.08	5.13	8.49
4136	6583	s Velorum		27.7	–44	33	10^h 48	217.9	13.6	32f	0.36	.59	5.60	6.19	6.55
4143	6205	t Velorum		28.8	–46	30	A	162.6	14.5	4f	3.67	.04	5.11	5.1	8.78
..	3797	– Velorum		29.4	–54	53	10^h 52	247.5	1.17	12f	0.91	.39	6.65	7.04	7.95
..	3813	– Velorum		41.4	–55	16	A	55.2	41.2	12f	2.65	.09	7.01	7.10	9.75
4257	2834	u Carinae		49.4	–58	19	A	13.3	63.7	12f	4.13	.02	3.86	3.88	8.01
4259	2314	54 Leonis		50.2	+25	17	5603	102.8	6.17	28	1.79	.19	4.32	4.51	6.30
..	7078	– Antliae		50.7	–34	58	A	169.3	34.0	12f	1.84	.18	8.04	8.22	10.06
..	1338	– Ursae Majoris		53.7	+59	28	5627	38.2	34.49	20e	1.70	.21	7.26	7.47	9.17

H. R.	DM.	Name.	R.A. 1900.		Dec. 1900.		Desig.	P.A.	Dist.	No.	Diff.	Corr.	AB.	A.	B.
			h.	m.	°	′		°	″						
..	1377	– Carinae	10	53.8	– 68	30	10^{h} 87	130.8	8.30	4f	2.10	.15	6.84	6.99	9.09
..	2964	– Carinae		58.3	– 59	59	A	321.4	11.1	12f	0.02	.74	8.98	9.72	9.74
..	*3013*	– Carinae	11	0.6	– 60	0	A	134.8	44.2	12f	0.53	.52	8.16	8.68	9.21
..	704	– Ursae Majoris		5.3	+ 66	33	C	223	66	8e	0.24	.64	7.70	8.34	8.58
..	2579	– Carinae		5.9	– 60	13	A	149.9	73.3	12f	0.68	.46	7.76	8.68	9.36
..	"	"		"	"	"	"	142.2	59.0	12f	0.24	.64	"	"	8.92
..	2598	– Carinae		6.7	– 60	12	A	60.0	64.4	12f	0.23	.64	8.15	8.79	9.02
..	3164	– Carinae		7.4	– 59	54	A	12.5	52.8	12f	0.64	.48	7.20	7.68	8.32
..	2572	– Leonis		8.5	+ 20	41	C	102	209	8e	3.68	.04	6.90	6.94	10.62
..	456	– Draconis		8.7	+ 74	1	5706	99.1	22.00	4e	0.29	.62	7.18	7.80	8.09
4375	2132	ξ Ursae Majoris		12.9	+ 32	6	5734	238.7	1.75	12a	0.46	.55	3.86	4.41	4.87
4370	6837	– Centauri		11.9	– 45	20	11^{h} 12	275.0	2.16	8f	0.28	.62	6.51	7.13	7.41
4377	2098	ν Ursae Majoris		13.1	+ 33	38	5735	146.5	7.09	10a	5.54	.01	3.71	3.72	9.26
..	2861	– Centauri		17.8	– 60	14	A	58.5	17.8	12f	0.19	.66	9.58	10.24	10.43
4399	2348	ι Leonis		18.7	+ 11	5	5765	92.4	2.19	10a	2.67	.09	4.03	4.12	6.79
4401	1659	– Muscae		19.1	– 64	24	11^{h} 19	291.6	2.62	4f	1.18	.32	5.34	5.66	6.84
4414	2502	83 Leonis		21.7	+ 3	33	5779	150.0	29.58	30	1.04	.35	6.19	6.54	7.58
..	6013	– Centauri		22.2	– 50	10	A	117.6	29.8	12f	0.43	.56	8.39	8.95	9.38
..	7009	– Centauri		22.7	– 45	14	A	348.2	36.9	12f	0.76	.44	9.24	9.68	10.44
4418	2504	τ Leonis		22.8	+ 3	24	5790	169.6	94.76	32	2.56	.10	5.08	5.18	7.74
4422	*2433*	57 Ursae Majoris		23.7	+ 39	54	5793	10.7	5.37	8e	3.14	.06	5.26	5.32	8.46
4423	*6565*	– Centauri		23.8	– 42	7	11^{h} 26	167.7	13.5	8f	2.58	.10	5.34	5.44	8.02
4441	3692	o^1 Centauri		27.1	– 58	53	11^{h} 29	128.0	18	12f	0.31	.61	4.35	4.96	5.27
4444	8928	N Hydrae		27.3	– 28	43	5820	205.5	9.77	24	0.09	.71	5.07	5.78	5.87
4484	2546	– Virginis		33.3	– 1	53	5855	280.6	5.09	4e	0.74	.44	6.25	6.69	7.43
4486	1947	– Ursae Majoris		33.5	+ 45	40	5858	266.0	10.46	14e	1.63	.22	6.34	6.56	8.19
..	4894	– Centauri		34.4	– 57	11	11^{h} 38	181.4	9.8	4f	1.27	.29	7.6	7.29	8.56
..	2206	– Centauri		35.1	– 62	55	A	278.5	28.3	12f	0.72	.45	7.29	7.74	8.45
4496	*2270*	61 Ursae Majoris		35.7	+ 34	46	C	101	159	4e	6.49	.00	5.46	5.46	11.95
4501	2179	62 Ursae Majoris		36.4	+ 32	18	C	299	86	4e	3.95	.03	5.71	5.74	9.69
4527	*2358*	93 Leonis		42.8	+ 20	46	5921	355.5	74.29	28	4.22	.02	4.52	4.54	8.76
4540	2489	β Virginis		45.5	+ 2	20	C	284	242	4e	7.90	.00	3.80	3.80	11.70
4560	1913	65 Ursae Majoris		49.9	+ 47	2	5962	113.8	62.93	4d	0.35	.59	5.87	6.46	6.81
..	3608	– Crucis		56.8	– 60	13	A	100.2	28.4	12f	1.47	.25	8.82	9.07	10.54
4615	1788	– Muscae	12	1.2	– 65	9	12^{h} 2	55.7	9.05	16f	1.74	.20	5.98	6.18	7.92
..	2246	– Canum Venat.		6.5	+ 36	39	C	2	29	4e	0.86	.41	8.30	8.71	9.57
..	1470	– Muscae		7.7	– 70	13	A	129.7	70.5	12f	0.37	.58	7.74	8.32	8.69
4652	7630	D Centauri		8.8	– 45	10	12^{h} 19	241.7	3.11	4f	1.21	.31	5.29	5.60	6.81
..	2205	– Canum Venat.		9.1	+ 33	20	6082	88.3	26.93	12e	1.83	.18	6.78	6.96	8.79
..	4936	– Crucis		9.5	– 55	14	A	34.5	23.1	12f	1.13	.33	8.41	8.74	9.87
4666	2284	2 Canum Venat.		11.1	+ 41	13	6102	259.6	11.42	14e	3.08	.06	5.80	5.86	8.94
..	380	– Camelopardalis		11.9	+ 80	41	6107	218.8	14.28	12e	0.47	.54	6.74	7.28	7.75
4678	3263	– Virginis		13.0	– 3	23	6113	196.3	20.06	14e	0.32	.60	6.05	6.65	6.97
4707	2337	12 Comae Beren.		17.5	+ 26	24	C	167	65	4e	3.49	.04	4.74	4.78	8.27
4730	2745	α^1 Crucis		21.0	– 62	33	12^{h} 41	115.9	4.96	64f	0.51	.53	1.05	1.58	2.09
4752	2354	17 Comae Beren.		23.9	+ 26	28	6180	250.7	145.35	22	1.36	.27	5.10	5.37	6.73
4757	3482	δ Corvi		24.7	– 15	58	6183	213.6	24.00	22	5.14	.01	3.11	3.12	8.26
4763	5272	γ Crucis		25.6	– 56	33	R	34.9	101.3	24f	4.94	.01	1.60	1.61	6.55
..	*2621*	– Virginis		30.0	+ 7	59	C	260	108	4e	1.02	.36	7.36	7.72	8.74
4792	*2584*	24 Comae Beren.		30.1	+ 18	56	6212	271.9	20.24	35	1.54	.24	4.94	5.18	6.72

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4822	3676	– Corvi	12	36.1	–12	28	6239	298.9	5.44	12e	0.10	.70	5.28	5.98	6.08
4826	2601	γ Virginis		36.6	– 0	54	6243	328.5	6.16	12a	*0.03*	.74	2.90	3.65	3.68
"	"	"		"	"	"	C	180	252	4 e	5.76	.01	"	2.91	8.67
..	*2504*	– Comae Beren.		40.5	+14	55	6263	211.6	32.60	20e	0.63	.48	6.28	6.76	7.39
4849	2468	33 Virginis		41.3	+10	6	C	190	173	8e	2.79	.08	5.78	5.86	8.65
4884	2551	32 Comae Beren.		47.2	+17	37	6292	48.8	194.77	20	0.44	.55	5.98	6.53	6.97
4893	*290*	– Camelopardalis		48.3	+83	58	6303	327.2	21.75	10a	0.53	.52	4.76	5.28	5.81
4894	*2519*	35 Comae Beren.		48.4	+21	48	6316	117.8	2.10	10a	4.74	.01	5.10	5.11	9.85
4898	5487	μ Crucis		48.8	–56	38	12^h 80	17.4	34.3	24f	0.91	.39	3.95	4.34	5.25
4915	*2580*	12 Canum Venat.		51.4	+38	52	6313	227.3	19.92	62	2.53	.10	2.80	2.90	5.43
..	*9088*	– Centauri		55.6	–33	5	12^h 91	235.7	6.72	12f	1.17	.32	6.75	7.07	8.24
4952	2183	θ Muscae	13	1.7	–64	46	13^h 5	184.7	5.08	4f	1.45	.25	5.64	5.89	7.34
4963	*3430*	θ Virginis		4.8	– 5	0	6405	344.0	7.07	24	3.78	.03	4.44	4.47	8.25
"	"	"		"	"	"	"	294.9	63.88	10e	6.30	.00	"	"	10.77
4968	2697	42 Comae Beren.		5.1	+18	4	C	327	117	4e	6.96	.00	4.47	4.47	11.43
4971	2614	17 Canum Venat.		5.5	+39	2	6410	297.5	289.98	20e	0.22	.65	5.37	6.02	6.24
4990	3562	54 Virginis		8.1	–18	17	13^h 17	34.4	5.20	8e	0.35	.59	6.27	6.82	7.17
4992	2649	– Comae Beren.		8.4	+19	15	B	283	558	6d	0.17	.67	5.78	6.45	6.62
..	*717*	35 Draconis		9.6	+67	52	6434	296.7	178.77	16e	0.46	.55	6.49	7.04	7.50
..	3635	– Virginis		9.7	–10	50	C	50	72	8e	1.03	.36	6.52	6.88	7.91
5021	2721	– Virginis		13.8	+ 4	13	B	61	257	4d	0.50	.53	6.56	7.09	7.59
5035	4627	J Centauri		16.2	–60	28	B	342.4	65	11f	1.40	.26	4.44	4.70	6.10
5054	1598	ζ Ursae Majoris		19.9	+55	27	6482	147.6	14.37	86	1.56	.23	2.17	2.40	3.96
5072	2621	70 Virginis		23.5	+14	19	C	138	289	8e	3.73	.03	5.13	5.16	8.89
5074	935	– Draconis		23.7	+65	15	6498	147.1	68.95	4d	0.35	.59	6.07	6.66	7.01
..	8828	– Centauri		29.5	–35	8	A	107.2	7.5	12f	0.27	.63	8.38	9.01	9.28
..	8859	– Centauri		31.7	–35	12	A	122.8	55.6	16f	0.52	.52	8.52	9.04	9.56
..	*8072*	– Centauri		31.7	–50	6	A	135.0	50.5	12f	3.43	.05	7.15	7.20	10.63
..	*5094*	– Centauri		33.5	–60	3	A	32.7	78.1	12f	0.60	.49	8.01	8.50	9.10
..	8615	– Centauri		34.2	–45	12	A	185.5	23.4	12f	0.60	.49	8.22	8.71	9.31
5141	*5725*	Q Centauri		35.4	–54	3	13^h 63	162.9	5.07	12f	1.45	.25	5.40	5.65	7.10
..	4041	– Centauri		42.2	–61	37	13^h 73	34.7	11.6	12f	0.42	.56	7.9	8.46	8.88
5189	9019	– Centauri		43.1	–35	12	13^h 74	353.0	11.45	12f	2.80	.08	6.47	6.55	9.35
5207	6787	N Centauri		45.6	–52	19	13^h 78	288.7	18.2	12f	2.16	.14	5.42	5.56	7.72
5210	9676	k Centauri		46.0	–32	30	13^h 79	109.3	8.11	24	1.45	.25	4.47	4.72	6.17
..	2370	– Circini		47.1	–66	25	A	48.8	25.2	12f	0.84	.41	7.83	8.24	9.08
..	8111	– Centauri		48.3	–50	12	A	78.4	18.9	12f	0.28	.62	7.80	8.42	8.70
..	*11170*	– Hydrae		50.4	–25	2	A	160.9	30.0	8f	0.96	.38	8.95	9.33	10.29
..	5880	– Centauri	14	1.0	–53	13	A	21.2	22.4	12f	0.48	.54	7.91	8.45	8.93
5329	1782	κ Bootis		9.9	+52	16	6778	237.7	12.60	40	2.01	.16	4.44	4.60	6.61
5350	*1784*	ι Bootis		12.6	+51	50	6802	33.2	38.05	30	3.45	.04	4.78	4.82	8.27
..	1498	– Draconis		12.8	+57	9	6804	142.8	6.01	4d	0.32	.60	6.60	7.20	7.52
5371	*6619*	– Centauri		15.5	–58	0	14^h 28	159.9	9.01	12f	1.95	.17	4.89	5.06	7.01
..	3834	– Virginis		17.3	– 7	19	6837	166.7	4.92	8e	0.04	.73	6.80	7.53	7.57
5386	*2882*	– Bootis		18.5	+ 8	54	6842	186.5	6.06	12e	1.53	.24	4.87	5.11	6.64
5409	2957	φ Virginis		23.0	– 1	47	6880	108.8	3.73	10a	4.00	.03	4.97	5.00	9.00
..	*11523*	– Hydrae		24.0	–25	6	6884	58.0	13.01	8f	1.79	.19	7.67	7.86	9.65
5415	2332	– Bootis		24.2	+28	44	6887	262.2	25.69	14e	0.50	.53	6.42	6.95	7.45
..	11528	– Centauri		28.1	–30	11	6905	7.6	2.44	4f	0.15	.68	9.48	10.16	10.31
5447	2536	σ Bootis		30.3	+30	11	C	82	237	4e	5.86	.00	4.48	4.48	10.34

H. R.	DM.	Name.	R.A. 1900.		Dec. 1900.		Desig.	P.A.	Dist.	No.	Diff.	Corr.	AB.	A.	B.
			h.	m.	°	′		°	″						
5447	2536	σ Bootis	14	30.3	+30	11	C	97	238	4e	5.88	.00	“	“	10.36
5459	5483	α^1 Centauri		32.8	−60	25	14^h 59	210.8	21.89	56f	1.37	.27	0.06	0.33	1.70
5463	2977	α Circini		34.4	−64	32	14^h 63	249.9	17.8	12f	5.41	.01	3.41	3.42	8.83
..	6120	– Lupi		35.6	−54	45	14^h 67	202.2	6.05	12f	0.13	.69	7.6	8.29	8.42
5475	*2768*	π Bootis		36.0	+16	51	6954	99.2	5.83	22	0.87	.40	4.54	4.94	5.81
5497	*11661*	m Hydrae		40.2	−25	1	6989	136.7	9.95	24	1.88	.18	5.03	5.21	7.09
5506	2417	ε Bootis		40.6	+27	30	6993	321.0	2.64	21	2.42	.11	2.59	2.70	5.12
..	1823	– Apodis		41.3	−70	7	A	139.8	16.4	12f	1.19	.31	8.38	8.69	9.88
5531	3966	α^2 Librae		45.3	−15	38	7018	314.5	230.85	35	2.18	.14	2.79	2.93	5.11
5544	2870	ξ Bootis		46.8	+19	31	7034	328.2	7.09	14	2.02	.16	4.64	4.80	6.82
5568	4125	– Librae		51.6	−20	58	7060	270.1	10.82	8e	2.18	.14	5.76	5.90	8.08
..	11870	– Centauri		53.5	−30	19	7075	339.1	8.70	12f	1.91	.17	7.05	7.22	9.13
5610	*2983*	– Virginis		59.2	+ 5	52	7111	346.4	9.62	16e	0.28	.62	6.44	7.06	7.34
5618	2259	i Bootis	15	0.5	+48	3	7120	234.0	2.86	10a	0.80	.42	4.86	5.28	6.08
5646	9704	κ Lupi		5.0	−48	22	15^h 10	144.2	26.9	11f	1.69	.21	3.97	4.18	5.87
5649	8830	ζ Lupi		5.1	−51	43	A	248.8	71.8	12f	3.23	.05	3.45	3.50	6.73
..	10157	– Lupi		7.9	−43	1	A	43.8	9.8	12f	0.94	.38	7.79	8.17	9.11
5659	2939	– Bootis		8.3	+19	40	7162	10.2	24.82	30e	0.80	.42	6.41	6.83	7.63
5681	2561	δ Bootis		11.5	+33	41	7194	78.9	104.87	33	4.46	.02	3.52	3.54	8.00
5683	9860	μ Lupi		11.5	−47	31	15^h 27	155.5	1.74	12f	2.57	.10	4.36	4.46	7.03
5694	2944	5 Serpentis		14.2	+ 2	9	7213	41.0	10.07	10a	4.61	.02	5.18	5.20	9.81
..	5935	– Circini		14.7	−60	0	A	54.9	11.1	12f	0.42	.56	8.14	8.70	9.12
5708	10066	ε Lupi		15.9	−44	20	15^h 38	172.0	26.7	8f	5.10	.01	3.74	3.75	8.85
..	*3173*	– Triang. Aust.		17.3	−65	0	A	6.2	13.0	12f	0.23	.64	8.70	9.34	9.57
5733	2636	μ Bootis		20.7	+37	44	7258	171.9	108.46	30	2.19	.14	4.33	4.47	6.66
..	9965	– Lupi		23.7	−41	34	15^h 47	228.3	5.80	12f	1.55	.23	6.54	6.77	8.32
..	6787	– Normae		24.8	−57	4	15^h 48	299.1	7.49	4f	1.52	.24	7.6	7.84	9.36
..	9731	– Lupi		26.7	−40	9	A	35.7	81.3	20f	3.31	.05	6.48	6.53	9.84
5765	12155	– Librae		27.3	−24	9	15^h 52	299.1	9.23	8e	0.04	.73	6.29	7.02	7.06
5789	*2821*	δ Serpentis		30.0	+10	53	7318	197.3	2.66	10a	0.93	.38	3.85	4.23	4.16
5816	4031	– Librae		33.2	− 8	28	7334	187.1	11.81	30e	0.07	.72	5.82	6.54	6.61
..	7155	– Normae		35.0	−57	48	15^h 72	103.7	7.17	4f	2.22	.13	8.5	8.63	10.85
5829	480	– Ursae Minoris		35.1	+80	47	7362	82.9	30.15	24e	0.68	.46	6.47	6.93	7.61
5834	*2665*	ζ Coronae Bor.		35.6	+36	58	7352	300.8	6.00	32	0.93	.38	4.69	5.07	6.00
5846	10245	– Lupi		37.7	−41	30	15^h 77	348.4	3.92	22f	1.42	.26	6.31	6.57	7.99
5851	3139	– Triang. Aust.		38.7	−65	8	15^h 80	152.0	1.85	4f	*0.04*	.73	5.75	6.48	6.52
5854	3088	α Serpentis		39.3	+ 6	44	7372	350.6	58.09	10a	10.22	.00	2.75	2.75	12.97
..	10503	– Lupi		40.6	−35	12	A	143.5	34.7	12f	0.62	.49	6.02	6.51	7.13
5867	2911	β Serpentis		41.6	+15	44	7386	265.0	30.64	18	6.23	.00	3.74	3.74	9.97
..	*10122*	– Normae		47.4	−50	3	15^h 93	12.3	12.31	12f	0.74	.44	6.81	7.25	7.99
5911	3024	39 Serpentis		48.5	+13	31	C	117	99	4e	6.50	.00	6.16	6.16	12.66
5925	10826	ξ Lupi		50.5	−33	40	15^h 97	48.4	10.6	24f	0.36	.59	4.78	5.37	5.73
5948	10797	η Lupi		53.4	−38	6	15^h 101	20.9	14.7	33	4.12	.02	3.61	3.63	7.75
5952	10120	– Lupi		54.2	−40	9	15^h 105	158.1	7.91	8f	3.72	.03	6.50	6.53	10.25
..	6348	– Triang. Aust.		55.2	−60	13	A	182.3	53.1	12f	1.00	.36	6.61	6.97	7.97
..	2916	– Serpentis		55.3	+17	40	C	39	29	4e	0.22	.65	7.98	8.63	8.85
5961	7500	ι^1 Normae		55.4	−57	29	15^h 106	249.6	10.99	12f	3.02	.07	4.87	4.94	7.96
..	2767	– Coronae Bor.		56.9	+26	27	C	111	48	4e	3 16	.06	7.83	7.89	11.05
5968	2663	ρ Coronae Bor.		57.2	+33	37	C	80	82	4e	5.04	.01	5.42	5.43	10.47
5984	4307	β Scorpii		59.6	−19	32	7493	26.5	13.65	10a	2.16	.14	2.76	2.90	5.06

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6006	11456	– Scorpii	16	3.2	–32	23	16^h 5	85.2	7.85	32	0.70	.46	6.30	6.76	7.46
6008	2964	κ Herculis		3.6	+17	19	7514	9.6	31.21	42	1.18	.32	5.02	5.34	6.52
6027	4333	ν Scorpii		6.2	–19	12	7533	334.9	38.33	18	2.20	.13	4.16	4.29	6.49
..	3091	– Herculis		8.6	+13	48	7551	315.5	3.20	8e	0.08	.71	6.81	7.55	7.63
..	"	"		"	"	"	C	125	243	4e	4.04	.03	"	6.84	10.88
6054	11453	– Scorpii		8.8	–25	13	A	82.8	30.1	12	3.73	.03	6.16	6.19	9.92
6063	2750	σ Coronae Bor.		10.9	+34	7	7563	89.3	1.31	24	0.90	.39	5.36	5.76	6.66
"	"	"		"	"	"	"	88.8	43.75	15a	5.07	.01	"	5.76	10.83
6077	13041	– Scorpii		13.2	–30	40	7572	319.4	23.32	32	1.37	.27	5.42	5.69	7.06
6084	11485	σ Scorpii		15.1	–25	21	7581	271.2	20.59	10a	5.44	.01	3.08	3.09	8.53
6085	10724	– Normae		15.5	–43	41	B	90	20	12f	3.53	.04	6.00	6.04	9.57
6097	11687	– Scorpii		17.5	–32	58	16^h 33	153.0	5.85	20	0.53	.52	6.54	7.06	7.59
6106	12513	– Scorpii		18.4	–29	29	7599	0.1	6.25	8e	0.65	.48	5.46	5.94	6.59
6107	2773	ν Coronae Bor.		18.6	+34	2	7608	165.5	371.88	16e	0.28	.62	4.56	5.19	5.47
"	"	"		"	"	"	"	15.6	104.56	10a	5.19	.01	"	4.57	9.76
6110	2716	23 Herculis		19.1	+32	34	C	18	34	4e	2.88	.07	6.20	6.27	9.15
6112	12861	ρ Ophiuchi		19.6	–23	13	7613	2.5	4.06	4d	0.70	.46	4.76	5.22	5.92
6115	10765	ε Normae		19.8	–47	20	16^h 45	335.3	22.8	12f	2.66	.09	4.71	4.80	7.46
6132	1591	η Draconis		22.6	+61	44	7634	144.0	4.66	12a	5.86	.00	2.89	2.89	8.75
..	12615	– Scorpii		26.3	–29	59	A	156.7	47.4	8f	0.24	.64	8.18	8.82	9.06
6162	2422	– Herculis		28.8	+45	50	7672	194.3	16.25	14e	2.94	.07	5.55	5.62	8.56
6174	10959	– Normae		31.4	–43	12	B	295.2	12	4f	3.06	.06	6.14	6.20	9.26
6185	1876	17 Draconis		33.9	+53	8	7702	14.7	90.42	18	*0.14*	.68	5.20	5.56	5.64
"	"	"		"	"	"	7703	116.5	3.74	24	1.02	.36	"	"	6.58
"	"	"		"	"	"	"	15.9	90.01	4e	*0.28*	.62	"	"	5.56
6187	11070	– Arietis		33.9	–48	34	B	265.0	9.6	12f	1.22	.31	5.59	5.90	7.12
6195	3235	m Herculis		35.6	+ 4	25	7711	230.1	69.67	22e	1.12	.33	5.40	5.73	6.85
6200	2531	42 Herculis		36.0	+49	7	7714	92.3	22.39	20	5.36	.01	5.14	5.15	10.51
..	3288	– Herculis		40.1	+ 6	17	7740	191.3	163.65	8e	3.56	.04	6.64	6.71	10.27
"	"	"		"	"	"	"	243.8	175.88	4e	3.78	.03	"	"	10.49
6228	3271	i Herculis		41.0	+ 8	46	7747	230.9	80.09	42	3.84	.03	5.35	5.38	9.22
..	10972	– Scorpii		41.5	–36	42	A	143.6	21.9	12f	1.07	.35	7.24	7.59	8.66
6232	3175	19 Ophiuchi		42.2	+ 2	14	7758	92.6	22.25	18e	3.22	.05	6.04	6.09	9.31
6236	10998	– Arietis		43.0	–49	52	16^h 73	43.9	2.62	4f	0.01	.75	6.55	7.30	7.31
6244	11023	– Scorpii		44.3	–37	21	16^h 75	6.1	6.88	24f	2.02	.16	6.22	6.38	8.40
6246	3233	– Herculis		45.0	+13	26	7768	36.6	5.67	4e	3.89	.03	5.95	5.98	9.87
..	7976	– Arietis		54.4	–54	55	A	59.4	29.5	4f	1.71	.20	9.45	9.65	11.36
..	*11113*	– Arietis		55.2	–50	0	16^h 100	232.3	7.51	12f	0.96	.38	7.01	7.39	8.35
6326	3095	– Herculis		57.0	+15	5	7836	238.4	19.13	8e	4.41	.00	6.16	6.16	10.57
6341	3292	– Herculis		59.1	+13	44	7845	115.3	292.48	18e	0.25	.63	5.24	5.87	6.12
..	2661	– Herculis	17	0.8	+28	14	C	241	8	4e	1.96	.17	7.20	7.37	9.33
..	11258	– Arietis		2.9	–46	36	17^h 4	166.8	7.97	12f	1.47	.25	6.98	7.23	8.70
6370	1857	μ Draconis		3.2	+54	36	7878	208.1	3.34	18	0.03	.74	5.06	5.80	5.83
6402	12026	A Ophiuchi		9.2	–26	27	7905	227.3	5.54	10a	0.04	.73	4.56	5.29	5.33
6406	3207	α Herculis		10.1	+14	30	7914	118.5	4.65	30	2.08	.15	3.31	3.46	5.54
6410	*3221*	δ Herculis		10.9	+24	57	7922	174.1	25.85	10a	5.44	.01	3.16	3.17	8.61
6424	13255	ο Ophiuchi		11.9	–24	11	7928	357.2	10.37	10a	1.51	24	5.15	5.39	6.90
6426	11626	– Scorpii		12.1	–34	53	17^h 35	129.3	29.98	15f	4.34	.02	5.89	5.91	10.25
6446	4722	ν Serpentis		15.2	–12	45	7957	30.8	50.21	22	4.59	.02	4.33	4.35	8.94
6458	2896	w Herculis		16.9	+32	36	C	334	210	4e	5.02	.01	5.35	5.36	10.38

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			h.	m.	°	′		°	″						
6485	2878	ρ Herculis	17	20.2	+37	14	8003	307.2	3.60	22	0.95	.38	4.14	4.52	5.47
..	11741	– Scorpii		21.8	–43	54	17^h 56	170.2	13.3	8f	2.34	.12	6.52	6.64	8.98
..	3184	– Ophiuchi		23.2	+11	29	8021	283.1	27.46	16e	1.45	.25	6.83	7.08	8.53
6548	3424	f Ophiuchi		29.9	+ 9	39	8067	191.4	41.08	19e	1.82	.19	5.58	5.77	7.59
6555	1945	ν Draconis		30.3	+55	14	8076	313.0	61.74	36	0.04	.73	4.21	4.94	4.98
6559	3157	– Herculis		31.7	+21	4	8082	33.2	10.17	12e	3.33	.05	5.82	5.87	9.20
..	13895	– Ophiuchi		36.8	–29	53	8110	290.3	36.81	12f	0.71	.45	8.44	8.89	9.60
..	11855	– Scorpii		37.6	–45	8	A	31.8	12.5	12f	0.74	.44	7.92	8.36	9.10
6609	3390	61 Ophiuchi		39.5	+ 2	37	8136	94.1	20.54	20	0.39	.58	5.67	6.25	6.64
6623	2888	μ Herculis		42.5	+27	47	8162	241.3	29.88	18	6.20	.00	3.48	3.48	9.68
6636	804	ψ Draconis		43.7	+72	12	8182	15.1	30.89	44	1.17	.32	4.58	4.90	6.07
..	11977	– Scorpii		44.4	–35	2	A	52.7	61.0	12f	1.56	.23	7.29	7.52	9.08
6691	12060	– Sagittarii		52.1	–36	51	A	263.2	46.4	12f	2.30	.12	5.66	5.78	8.08
6693	15035	– Sagittarii		52.7	–30	14	8244	104.7	5.43	20	1.73	.20	5.07	5.27	7.00
6714	3458	67 Ophiuchi		55.6	+ 2	56	8284	141.3	55.23	22	4.06	.03	3.89	3.92	7.98
6730	3280	95 Herculis		57.2	+21	36	8302	261.7	6.06	30	0.08	.71	4.42	5.13	5.21
..	12116	67 Ophiuchi		57.4	–40	1	A	286.4	17.4	12f	0.85	.41	9.16	9.57	10.42
6752	3482	70 Ophiuchi	18	0.4	+ 2	31	8340	148.2	3.98	11a	1.70	.21	4.07	4.28	5.98
6758	3383	– Ophiuchi		1.1	+12	0	8348	257.9	6.84	14e	0.36	.59	6.46	7.05	7.41
6781	3178	100 Herculis		3.8	+26	5	8377	182.9	13.85	22	0.08	.71	5.21	5.92	6.00
6810	571	41 Draconis		7.5	+79	59	8441	235.6	20.62	4d	0.38	.58	5.22	5.80	6.18
6812	4908	μ Sagittarii		7.8	–21	5	8413	312.1	48.32	10a	5.70	.01	3.99	4.01	9.71
"	"	"		"	"	"	"	115.4	50.13	10a	5.35	.01	"	"	9.36
..	2527	– Pavonis		8.5	–70	8	A	191.1	60.5	12f	1.37	.27	8.29	8.56	9.93
6850	1252	36 Draconis		13.3	+64	22	C	264	290	4e	5.38	.01	5.02	5.03	10.41
..	1253	– Draconis		13.8	+64	43	C	281	299	4e	1.76	.20	7.10	7.30	9.06
6869	4599	η Serpentis		16.1	– 2	55	8498	77.2	112.70	14	7.52	.00	3.42	3.42	10.94
6895	3411	109 Herculis		19.4	+21	43	C	320	219	4e	7.06	.00	3.92	3.92	10.98
6896	5134	21 Sagittarii		19.4	–20	35	8529	293.4	2.45	11a	2.52	.10	4.96	5.06	7.58
6918	3936	d Serpentis		22.1	+ 0	8	8562	314.1	3.95	10a	2.10	.15	5.33	5.48	7.58
6923	1809	b Draconis		22.5	+58	45	8574	5.9	3.14	36	2.65	.09	4.78	4.94	7.59
"	"	"		"	"	"	"	21.7	88.99	14	2.87	.07	"	"	7.65
..	15055	– Sagittarii		25.8	–29	56	A	302.5	89.4	12f	0.28	.62	8.46	9.08	9.36
6946	4713	– Scuti		25.9	–10	52	8605	257.9	12.35	4e	3.10	.06	5.80	5.86	8.96
6953	12895	κ Coronae Austr.		26.5	–38	47	18^h 61	357.0	21.7	12f	0.60	.49	5.46	6.55	5.95
..	12924	– Sagittarii		27.8	–34	53	18^h 64	136.9	1.73	4f	0.19	.66	6.94	7.60	7.79
..	3801	– Ophiuchi		30.6	+ 4	51	8654	11.9	26.91	18e	2.96	.07	6.72	6.79	9.75
6983	2238	– Draconis		31.6	+52	16	8669	272.7	25.69	20e	3.35	.05	5.42	5.47	8.82
6997	3154	– Lyrae		32.9	+33	23	8681	205.5	7.33	4 e	4.48	.02	5.46	5.48	9.96
7001	3238	α Lyrae		33.6	+38	41	8692	137.8	42.96	12a	9.97	.00	0.14	0.14	10.11
7012	3948	– Pavonis		35.7	–64	58	A	64.1	73.5	4f	4.55	.02	4.88	4.90	9.45
7051	3510	ε Lyrae		41.0	+39	34	8782	172.9	207.08	22	0.08	.71	3.83	4.68	4.88
"	"	"		"	"	"	8783	26.0	3.03	11a	0.96	.38	4.68	5.06	6.02
7053	3509	5 Lyrae		41.1	+39	30	8785	155.2	2.57	12a	0.23	.64	4.50	5.14	5.97
7059	3559	5 Aquilae		41.3	– 1	3	8779	121.5	13.22	23e	1.43	.26	5.68	5.94	7.37
7056	3222	ζ Lyrae		41.3	+37	30	8788	149.7	43.71	39	1.38	.27	4.06	4.33	5.71
7061	3926	110 Herculis		41.4	+20	27	8786	92.0	61.16	10a	8.91	.00	4.26	4.26	13.17
7099	3685	– Aquilae		46.0	+10	52	8860	183.2	3.53	4e	1.05	.35	6.63	6.98	8.03
7102	3228	ν Lyrae		46.2	+32	26	8862	122.2	58.58	4e	5.79	.01	5.15	5.16	10.95
7125	1925	ο Draconis		49.7	+59	16	8906	346.2	30.33	38	3.32	.05	4.78	4.83	8.15

H. R.	DM.	Name.	R.A. 1900.		Dec. 1900.		Desig.	P.A.	Dist.	No.	Diff.	Corr.	AB.	A.	B.
			h.	m.	°	′		°	″						
7141	3916	θ Serpentis	18	51.2	+ 4	4	8914	103.8	21.65	10a	0.87	.40	4.10	4.50	5.37
7170	13018	– Coronae Austr.		54.3	– 37	12	18^h 97	282.6	11.6	20f	0.23	.64	5.97	6.61	6.84
7172	3841	11 Aquilae		54.5	+ 13	30	8940	241.6	18.66	14e	3.92	.03	5.37	5.60	9.52
7191	1669	– Draconis		56.3	+ 62	16	8977	123.4	16.63	4e	2.65	.09	6.44	6.53	9.18
. .	13476	– Sagittarii	19	6.1	– 34	1	A	37.3	14.6	12f	0.67	.47	6.67	7.14	7.81
. .	3477	– Lyrae		7.6	+ 26	5	B	317	147	4d	0.12	.69	6.66	7.35	7.47
7294	2959	– Cygni		9.5	+ 49	39	9137	224.8	10.46	16e	0.22	.65	5.97	6.62	6.84
7298	3490	η Lyrae		10.4	+ 38	58	9144	84.9	27.89	60	4.04	.03	4.46	4.49	8.53
7337	13277	β^1 Sagittarii		15.4	– 44	39	19^h 13	76.8	28.5	12f	2.95	.07	4.24	4.31	7.26
7369	3839	2 Sagittae		19.8	+ 16	45	9277	78.9	336.19	7e	0.86	.41	5.62	6.03	6.89
7373	3833	b Aquilae		20.2	+ 11	44	C	346	109	8e	3.18	.06	5.17	5.23	8.41
7391	4017	– Vulpeculae		22.1	+ 19	41	9308	43.6	22.65	8e	4.66	.01	6.04	6.05	10.71
7405	3759	6 Vulpeculae		24.5	+ 24	28	9350	27.7	396.19	8	1.20	.31	4.35	4.66	5.86
7412	3904	– Aquilae		25.2	+ 2	41	9355	5.0	34.90	4e	5.11	.01	6.38	6.39	11.50
7417	3410	β Cygni		26.7	+ 27	45	9374	55.7	34.29	68	2.12	.14	3.10	3.24	5.36
7448	2060	– Draconis		31.7	+ 59	57	9448	287.1	76.61	16e	1.70	.21	6.22	6.43	8.13
7462	1053	σ Draconis		32.6	+ 69	29	C	340	316	4e	6.62	.00	4.78	4.78	11.40
7463	3918	ε Sagittae		32.8	+ 16	14	9458	81.5	91.87	22	2.86	.08	5.59	5.67	8.53
. .	5078	– Aquilae		37.7	– 8	33	9525	146.7	96.52	12e	0.41	.57	6.36	6.93	7.34
7503	2847	c Cygni		39.1	+ 50	18	9560	136.2	37.31	26	0.11	.70	5.56	6.26	6.37
7534	3587	17 Cygni		42.6	+ 33	30	9617	73.3	25.75	32	3.36	.05	5.01	5.08	8.44
"	"	"		"	"	"	"	140	143	8	4.14	.02	"	"	9.22
7546	4254	ζ Sagittae		44.5	+ 18	53	9643	312.8	8.49	24	3.70	.04	4.95	4.99	8.69
7548	9221	– Telescopii		44.7	– 55	13	19^h 64	148.9	23.0	12f	0.59	.50	5.64	6.14	6.73
7582	*1070*	ε Draconis		48.5	+ 70	1	9713	354.5	2.79	20	3.02	.07	3.99	4.06	7.08
. .	4195	– Vulpeculae		49.0	+ 20	5	9705	147.9	42.22	24e	0.22	.65	6.59	7.24	7.46
7593	5154	57 Aquilae		49.3	– 8	29	9707	171.4	35.55	22e	0.75	.44	5.34	5.78	6.53
7619	2572	ψ Cygni		53.0	+ 52	10	9765	184.6	3.32	14a	2.50	.10	4.80	4.90	7.40
7660	3158	e Cygni		58.5	+ 49	49	9854	146.3	41.73	22	3.74	.03	5.25	5.28	9.02
7666	*1084*	– Draconis		59.0	+ 70	5	B	55	137	4d	1.48	.25	6.21	6.46	7.94
7672	4121	15 Sagittae		59.7	+ 16	48	C	317	213	8e	1.14	.33	5.39	5.89	7.03
"	"	"		"	"	"	"	253	350	4e	2.36	.12	"	"	8.25
"	"	"		"	"	"	"	274	196	4e	3.39	.05	"	"	9.28
7705	4453	θ Sagittae	20	5.5	+ 20	37	9955	326.7	11.40	22e	2.13	.14	6.32	6.46	8.59
7735	2882	o^1 Cygni		10.5	+ 46	26	10036	323.7	337.83	20e	1.17	.32	3.57	3.95	5.12
"	"	"		"	"	"	"	174.0	106.85	10a	3.15	.06	"	"	7.10
7750	764	κ Cephei		12.3	+ 77	25	10085	124.1	7.37	22	3.69	.04	4.40	4.44	8.13
. .	13785	– Sagittarii		11.2	– 40	30	20^h 20	113.2	9.63	4f	0.17	.67	7.07	7.74	7.91
7764	16981	– Sagittarii		14.3	– 29	30	10086	324.7	25	20	0.94	.38	6.32	6.70	7.64
7776	5629	β Capricorni		15.4	– 15	6	10112	267.2	204.97	22	2.85	.08	3.18	3.26	6.11
7830	*5831*	o Capricorni		24.1	– 18	55	10246	239.7	22.06	8e	0.62	.49	5.58	6.07	6.69
7840	4307	– Delphini		26.5	+ 10	57	10281	256.3	14.19	8e	0.22	65	6.39	7.04	7.26
. .	4310	– Aquarii		27.3	+ 1	50	B	352	315	6d	0.77	.43	6.24	6.67	7.44
. .	3148	– Cygni		27.8	+ 48	52	C	278	61	4e	2.95	.07	6.47	6.54	9.49
7851	3154	ω^2 Cygni		28.2	+ 48	53	C	323	57	8e	4.74	.01	5.56	5.57	10.31
7864	1644	μ^2 Octantis		29.8	– 75	42	20^h 52	16.0	17.7	12f	0.52	.52	6.56	7.08	7.60
. .	*3858*	– Pavonis		30.9	– 64	57	A	5.1	21.2	12f	1.17	.32	8.12	8.44	9.61
7882	4369	β Delphini		32.9	+ 14	15	10363	343.8	32.48	10a	6.89	.00	3.72	3.72	10.61
7885	4159	48 Cygni		33.4	+ 31	13	10373	174.8	178.10	20e	0.12	.69	5.56	6.25	6.37
. .	15029	– Microscopii		34.2	– 42	45	R	301.0	20	8f	3.82	.03	6.52	6.55	10.37

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			h.	m.	°	′		°	″						
..	4172	– Cygni	20	34.9	+38	17	10402	351.7	11.25	4e	1.96	.17	6.78	6.95	8.91
7942	4167	52 Cygni		41.6	+30	21	10516	57.2	6.62	27	4.90	.01	4.34	4.35	9.25
7948	4255	γ Delphini		42.0	+15	46	10509	273.7	11.90	34	0.98	.37	4.12	4.49	5.47
7963	*4267*	λ Cygni		43.5	+36	7	C	105	85	8e	5.01	.01	4.46	4.47	9.48
7965	14660	α Microscopii		43.8	−34	9	$20^{h}74$	166.6	20.1	12f	4.96	.01	5.00	5.01	9.97
7984	3739	56 Cygni		46.6	+43	41	C	45	76	4e	7.16	.00	5.07	5.07	12.23
8047	*3133*	f¹ Cygni		56.4	+47	8	10670	352.4	20.23	47	4.36	.02	4.86	4.88	9.24
8059	5664	12 Aquarii		58.7	− 6	13	10698	189.6	2.67	8e	1.42	.26	5.63	5.89	7.31
8085	4343	61 Cygni	21	2.4	+38	15	10732	91.1	15.62	30	0.71	45	5.08	5.57	6.28
"	"	"		"	"	"	"	197	278	4e	3.62	.04	"	6.28	9.90
8094	4324	– Cygni		4.4	+29	48	10773	315.6	3.55	4e	2.14	.14	5.57	5.71	7.85
8101	*4486*	– Vulpeculae		6.0	+22	3	10795	300.8	17.83	8e	0.98	37	6.37	6.74	7.72
..	18118	– Microscopii		6.1	−31	0	$21^{h}9$	231.3	3.08	4f	1.74	.20	7.10	7.30	9.04
..	14175	– Microscopii		9.2	−39	52	A	183.5	58.6	12f	1.13	.33	8.05	8.38	9.51
8123	4746	δ Equulei		9.6	+ 9	36	10829	38.8	27.40	26	5.76	.01	4.61	4.62	10.38
8130	4240	τ Cygni		10.8	+37	37	10846	260.3	15.68	4e	6.05	.00	3.82	3.82	9.87
8173	4691	1 Pegasi		17.5	+19	23	10932	311.2	36.20	36	4.96	.01	4.24	4.25	9.21
8179	2227	– Cephei		18.0	+60	21	B	16	299	4d	0.28	.62	6.24	6.86	7.14
8189	4537	– Cygni		19.3	+36	58	10966	302.5	365.42	8	*0.20*	.65	5.83	6.48	6.68
8238	*1173*	β Cephei		27.4	+70	7	11046	250.0	13.57	26	4.50	.02	3.32	3.34	7.84
..	1415	– Cephei		32.3	+66	17	11107	26.1	179.09	32e	0.12	.69	6.36	7.05	7.17
8263	*4180*	– Aquarii		32.4	− 0	50	11095	163.5	31.05	16e	2.93	.07	6.27	6.34	9.27
8265	*4830*	3 Pegasi		32.7	+ 6	10	11103	349.4	39.14	16e	1.30	.29	6.05	6.34	7.64
..	*18754*	– Piscis Austr.		33.6	−29	55	11113	292.5	10.65	12f	1.18	.32	9.17	9.49	10.67
8308	4891	ε Pegasi		39.3	+ 9	25	11205	323.0	138.51	18	5.97	.00	2.54	2.54	8.51
8309	4169	μ Cygni		39.6	+28	18	11214	114.5	5.66	21	1.35	.28	4.29	4.73	6.08
"	"	"		"	"	"	"	61.3	217.40	8e	1.98	.16	"	"	6.71
8315	*4463*	κ Pegasi		40.1	+25	11	11222	308.5	11.01	12a	5.72	.01	4.27	4.28	10.00
8323	13928	– Gruis		41.7	−47	45	$21^{h}55$	359.8	45.0	4f	2.96	.07	5.63	5.70	8.66
8326	18466	θ Piscis Austr.		41.9	−31	21	A	335.2	28	8f	6.09	.00	5.09	5.09	11.18
8357	2639	– Cygni		48.8	+55	20	11323	194.0	20.01	26e	0.85	.41	5.54	5.95	6.80
8363	5329	– Aquarii		49.4	− 3	46	11327	185.2	21.65	22e	3.31	.05	6.18	6.23	9.54
8384	1691	– Cephei		54.7	+65	41	B	117	91	4d	0.28	.62	5.66	6.28	6.56
8396	6422	29 Aquarii		57.0	−17	27	11434	243.4	4.37	8e	0.02	.74	6.49	7.23	7.25
..	2456	15 Cephei	22	0.6	+59	19	11477	38.8	90.25	8e	3.14	.06	6.68	6.74	9.88
8417	*1802*	ξ Cephei		0.9	+64	8	11483	288.9	5.60	20	1.90	.17	4.40	4.57	6.47
8423	673	– Cephei		1.9	+82	23	11514	77.3	13.79	11e	0.25	.63	6.49	7.12	7.37
..	*998*	– Octantis		9.6	−80	57	A	25.7	9.4	12f	0.33	.60	8.97	9.57	9.90
8526	1748	– Octantis		17.1	−75	31	B	82.9	17.9	4f	2.38	.11	6.17	6.28	8.66
8532	5139	33 Pegasi		18.8	+20	20	C	343.0	56.56	8e	2.20	.13	6.00	6.13	8.33
8545	6521	f Aquarii		21.2	−17	15	11715	303.1	10.03	8e	0.22	.65	5.70	6.35	6.57
8559	4365	ζ Aquarii		23.7	− 0	32	11743	359.8	3.60	14	0.17	.67	3.75	4.42	4.59
8560	14935	δ² Gruis		23.8	−44	15	A	213.7	61.6	8f	5.11	.01	4.30	4.31	9.42
8576	17126	β Piscis Austr.		25.9	−32	52	$22^{h}30$	171.0	30.2	22	3.44	.04	4.36	4.40	7.84
8603	*4808*	8 Lacertae		31.4	+39	7	11839	185.7	22.47	24e	0.72	.45	5.38	5.83	6.55
8622	4826	10 Lacertae		34.8	+38	32	11877	48.7	60.44	8e	5.11	.01	4.90	4.91	10.02
8673	6346	69 Aquarii		42.4	−14	35	11967	112.2	30.70	12e	3.86	.03	5.70	5.73	9.59
8725	*4949*	16 Lacertae		51.9	+41	4	12068	47.1	63.54	26e	3.66	.04	5.50	5.54	9.20
..	549	– Octantis		52.8	−85	4	A	122.4	9.5	8f	0.10	.70	9.17	9.87	9.97
8737	4973	– Pegasi		53.5	+ 8	50	C	84	242	4e	4.24	.02	6.48	6.50	10.74

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			h.	m.	°	′		°	″						
8782	6018	h Aquarii	22	59.9	− 8	14	12143	146.0	262.11	8e	1.85	.18	5.38	5.56	7.41
8793	13471	− Gruis	23	1.5	−51	14	23^h 4	258.9	8.33	12f	0.67	.47	5.65	6.12	6.79
..	7635	− Tucanae		2.5	−60	17	A	297.5	15.4	12f	2.09	.15	7.3	7.45	9.54
8815	*4981*	57 Pegasi		4.5	+ 8	8	12188	198.1	32.56	12e	5.38	.01	5.41	5.42	10.80
8827	4580	60 Pegasi		6.9	+26	18	C	294	232	8e	3.10	.06	6.34	6.40	9.50
8832	2966	− Cassiopeiae		8.5	+56	37	C	202	101	4e	4.08	.03	5.62	5.65	9.73
8841	6156	ψ^1 Aquarii		10.7	− 9	38	12257	312.2	49.63	36	4.60	.02	4.44	4.46	9.06
8866	6448	94 Aquarii		13.8	−14	0	12292	345.1	13.37	16e	2.18	.14	5.27	5.41	7.59
8877	13948	− Gruis		15.2	−50	51	23^h 25	209.8	16.4	12f	2.67	.09	6.11	6.20	8.87
8895	10281	− Gruis		18.2	−54	22	23^h 28	211.2	25.8	12f	0.89	.40	6.08	6.48	7.37
..	3325	− Tucanae		25.0	−69	38	A	199.3	36.5	12f	2.06	.15	7.20	7.35	9.41
..	2746	− Cassiopeiae		29.0	+59	54	12434	210.6	247.15	20e	*0.22*	.65	6.61	7.26	7.48
8961	4283	λ Andromedae		32.7	+45	55	C	89	218	4e	7.30	.00	4.00	4.00	11.30
8966	14651	− Phoenicis		34.1	−47	12	23^h 48	270.0	4.30	4f	0.57	.50	6.28	6.78	7.35
..	4989	− Pegasi		42.6	+16	30	12563	347.6	71.09	8e	0.10	.70	7.14	7.84	7.94
..	*19728*	− Sculptoris		48.6	−29	58	12619	222.3	25	16f	3.00	.07	7.45	7.52	10.52
9044	16479	− Sculptoris		49.2	−27	36	12623	267.5	6.85	8e	0.39	.58	6.27	6.85	7.24
9075	*4747*	− Andromedae		54.4	+33	11	12675	191.0	3.78	4e	0.12	.69	5.83	6.52	6.64
9077	15420	− Phoenicis		55.2	−44	51	A	159.1	114.9	12f	3.52	.04	6.19	6.23	9.75
9088	4734	85 Pegasi		56.8	+26	34	C	339.2	41.48	4e	3.93	.03	5.85	5.88	9.81
9094	1987	− Cassiopeiae		57.5	+65	33	12704	70.0	15.15	18e	1.45	.25	5.77	6.02	7.47

REMARKS.

h. m.

0 3.2. The observations of this star, made in August and September, 1878, H.A. **11**, 110, are very discordant and have been rejected. They differ, on the average, by a magnitude and a half. The interval, however, is so great that it cannot be measured with accuracy. Four sets of four settings each were accordingly made on January 10, 1908, by Professor Wendell, with the photometer having direct vision prisms. The star H.R. 8, magn. 6.20, which precedes $1^m.8$, south 3′, was compared with both components of α Andromedae. It measured 3.88 fainter than one, and 4.35 brighter than the other component. In H.A. **11**, 145, for 8.32, 6.672, 2130., read 8.27, 6.692, 2030.

0 27.0. Preceding component H.R. 126, β^1 Tucanae. In H.A. **50**, 20, magnitudes of components, 4.52 and 4.48.

0 41.0. In H.A. **54**, 12, magnitudes of components, 7.36 and 7.61.

1 18.9. The first measure gives the difference in brightness between the principal star and the two fainter components. The combined light of the two fainter components, computed from the last two measures, is 9.83.

h. m.

1 31.6. In H.A. **50**, 201, magnitudes of components, 6.03 and 7.10.

1 34.5. Not measured with Meridian Photometer. Components, +14° 251, magn. 9.0, and +14° 253, magn. 9.0. The combined light, 8.25, has been derived from these magnitudes.

1 36.0. In H.A. **50**, 27, magnitudes of components, 6.00 and 6.03.

1 50.0. In H.A. **50**, 29, magnitudes of components, 5.82 and 6.06.

2 39.5. In H.A. **50**, 202, magnitudes of components, 7.04 and 7.15.

3 4.4. Not measured with Meridian Photometer. Components, +6° 486, magn. 8.3, and +6° 487, magn. 8.5. The combined light, 7.64, has been derived from these magnitudes.

4 10.2. In H.A. **50**, 44, magnitudes determined with Meridian Photometer, 6.54, and 7.16.

4 29.3. Not measured with Meridian Photometer. Magnitudes derived from C. P. D. magnitude 7.5, of − 77° 172, which represents the combined light.

5 29.6. The magnitudes of these components are derived from H.A. **50**, 55, 205.

h. m.

7 37.4. In H.A. **50**, 77, magnitudes of components, 7.16 and 7.26.

7 40.9. 2 Argus.

7 56.4. In H.A. **50**, 80, magnitudes of components, 6.43 and 6.65.

9 22.1. 41 Lyncis.

9 41.4. Not measured with Meridian Photometer. Components, −48° 4962, magn. 8.0, and −48° 4963, magn. 8.0. The combined light, 7.25, has been derived from these magnitudes.

10 11.1. In H.A. **50**, 98, magnitudes of components, 3.65 and 5.91.

10 27.7. In H.A. **50**, 100, for H. R. 4135 and 4136 the magnitudes, 6.19 and 6.54, should be reversed.

11 5.3. Both components measured with 12-inch Meridian Photometer, with resulting magnitudes, 8.46 and 8.45. The combined light, 7.70, has been derived from these magnitudes.

11 27.3. 17 Crateris. In H.A. **50**, 106, magnitudes of components, 5.78 and 5.86.

11 34.4. Not measured with Meridian Photometer. Magnitudes derived from C. P. D. magnitude, 7.6, of −57° 4894, which represents the combined light.

11 35.1. Not observed with Meridian Photometer. Components, −62° 2206, magn. 7.8, and −62° 2205, magn. 8.3. The combined light, 7.29, has been derived from these magnitudes.

12 6.5. Both components measured with 12-inch Meridian Photometer, with resulting magnitudes, 9.45 and 8.76. The combined light, 8.30, has been derived from these magnitudes.

12 8.8. In H.A. **50**, 212, magnitudes of components, 5.51 and 7.11.

12 25.6. Position angle and distance taken from Webb.

12 47.2. The fainter component is 33 Comae Berenicis.

13 5.5. The fainter component is 15 Canum Venaticorum.

13 8.4. The fainter component is H.R. 4987.

13 9.6. The fainter component is 34 Draconis.

13 42.2. Not observed with Meridian Photometer. Magnitudes derived from C. P. D. magnitude, 7.9, of −61° 4041, which represents the combined light.

13 47.1. Not observed with Meridian Photometer. Components, −66° 2370, magn. 8.4, and −66° 2371, magn. 8.8. The combined light, 7.83, has been derived from these magnitudes.

14 1.0. Not observed with Meridian Photometer, Components, −53° 5880,magn. 8.4, and −53° 5879, magn. 9.0. In the Argentine Zone Catalogue, the corresponding magnitudes are 9.0 and 8.5. The preceding component is accordingly the brighter visually, but the fainter photographically. The combined light, 7.91, has been derived from these magnitudes.

14 32.8. Spectroscopic binary. Period 81^y, not 81^d as given in Lick Bulletin 79 and in H.A. **50**, 214.

14 35.6. Recorded as ZC. 2221?, but it seems more probable that 14^h 2164, which precedes $1^m.1$, south 1′, was the object observed, and this has been assumed. Not observed with Meridian Photometer. Magnitudes derived from C. P. D. magnitude, 7.6, of −54° 6120, which represents the combined light.

15 24.8. Not observed with Meridian Photometer. Magnitudes derived from C. P. D. magnitude, 7.9, of −57° 6787, which represents the combined light.

15 27.3. See found the fainter companion a close double having components of equal light. The magnitude of each would then be 7.81.

15 35.0. Not observed with Meridian Photometer. Magnitudes derived from C. P. D. magnitude, 8.5, of −57° 7155, which represents the combined light.

15 55.3. Both components measured with 12-inch Meridian Photometer, with resulting magnitudes, 8.64 and 8.84. The combined light, 7.98, has been derived from these magnitudes.

16 59.1. The preceding component is 33 Ophiuchi, the following, 34 Ophiuchi.

17 12.1. Brighter component double, magnitudes, 6.1 and 8.1. P.A. 310°.2, Dist. 1″.86.

18 54.3. In H.A. **50**, 161, magnitudes of components 6.62 and 6.84.

20 34.2. Position angle and distance taken from No. 5211 of the Cape Catalogue.

21 19.3. The measures make the north preceding component the brighter.

21 54.7. In H.A. **50**, 185, the magnitude, 6.28, is assumed to relate to the combined light.

23 2.5. Not observed with Meridian Photometer. Magnitudes derived from C. P. D. magnitude, 7.3, of −60° 7635, which represents the combined light.

23 29.0. The measures make the south preceding component the brighter.

23 42.6. Not observed with Meridian Photometer. Components, +16° 4989, magn. 7.8, and +16° 4990, magn. 8.0. The combined light, 7.14, has been derived from these magnitudes.

When a double star has been measured in two or more of the series designated by the letters a to f, the results of the separate measures are given in Table II. The right ascension and the declination are given in the first two columns, and are taken from Table I. The number of measures, the letter indicating the series, as described on page 162, the mean of the differences of the magnitudes, and the residual from the mean of the measures of the different series are given in the last three columns. The positions of the triple stars are repeated, to show that the measures relate to different components.

TABLE II.

STARS MEASURED IN MORE THAN ONE SERIES.

R.A. 1900.	Dec. 1900.	No.	Diff.	Res.	R.A. 1900.	Dec. 1900.	No.	Diff.	Res.	R.A. 1900.	Dec. 1900.	No.	Diff.	Res.
h. m.	° ′				h. m.	° ′				h. m.	° ′			
0 27.3	+ 6 25	12 a	3.60	*01*	3 36.0	+33 39	14 a	4.82	*08*	5 26.9	− 0 23	14 e	4.41	02
“ “	“ “	16 e	3.62	01	“ “	“ “	12 e	4.99	09	5 29.6	+ 9 52	10 a	1.90	00
0 31.5	+33 10	10 a	4.25	*01*	3 41.5	+23 48	12 a	3.25	*04*	“ “	“ “	8 e	1.90	00
“ “	“ “	12 e	4.26	00	“ “	“ “	10 a	3.29	00	5 30.5	− 5 29	10 a	1.51	15
0 34.6	+20 54	13 a	3.27	03	“ “	“ “	16 e	3.32	03	“ “	“ “	18 e	1.20	*16*
“ “	“ “	12 e	3.22	*02*	3 42.8	+10 50	10 a	4.13	05	5 30.5	− 5 59	12 a	4.53	09
0 34.8	+55 59	12 a	6.62	12	“ “	“ “	16 e	4.02	*06*	“ “	“ “	12 e	4.34	*10*
“ “	“ “	12 a	6.46	*04*	3 44.9	−37 55	12 a	0.62	06	5 32.2	+30 26	10 a	2.95	*02*
“ “	“ “	12 e	6.41	*09*	“ “	“ “	4 e	0.46	*10*	“ “	“ “	18 e	2.99	02
0 43.0	+57 17	10 a	3.85	11	“ “	“ “	12 f	0.61	05	5 33.7	− 2 39	10 a	2.68	*05*
“ “	“ “	12 e	3.64	*10*	3 47.8	+31 35	14 a	6.26	*13*	“ “	“ “	12 e	2.78	05
1 0.4	+20 56	10 a	0.20	*02*	“ “	“ “	4 e	6.52	13	5 33.7	− 2 39	10 a	2.91	03
“ “	“ “	20 e	0.25	03	3 49.2	− 3 14	10 a	1.38	00	“ “	“ “	16 e	2.86	*02*
1 8.5	+ 7 3	10 a	0.96	04	“ “	“ “	12 e	1.39	01	5 40.3	−22 29	4 a	2.32	*08*
“ “	“ “	18 e	0.87	*05*	3 51.1	+39 43	10 a	4.92	*04*	“ “	“ “	12 e	2.49	09
1 18.9	+67 36	19 a	4.46	*15*	“ “	“ “	16 e	4.99	03	6 18.5	+ 4 39	12 a	2.15	09
“ “	“ “	12 a	4.81	20	4 10.7	− 7 49	10 a	5.27	27	“ “	“ “	14 e	1.98	*08*
“ “	“ “	14 e	4.55	*06*	“ “	“ “	16 e	4.73	*27*	6 37.8	+25 14	12 a	5.84	*18*
1 22.6	+88 46	12 a	6.57	*10*	4 30.2	+ 9 57	6 a	3.45	15	“ “	“ “	14 e	6.19	17
“ “	“ “	16 a	6.67	00	“ “	“ “	12 e	3.16	*14*	7 12.3	+16 43	12 a	6.02	*08*
“ “	“ “	8 e	6.78	11	4 36.2	+22 46	11 a	2.92	08	“ “	“ “	4 e	6.17	07
1 48.0	+18 49	12 a	*0.06*	*14*	“ “	“ “	12 e	2.77	*07*	7 25.1	−31 38	8 e	0.58	*15*
“ “	“ “	14 e	0.22	14	4 52.5	+37 44	10 a	2.62	*05*	“ “	“ “	16 f	0.88	15
1 52.4	+23 7	10 a	2.51	00	“ “	“ “	12 e	2.72	05	7 28.2	+32 6	10 a	0.82	*04*
“ “	“ “	16 e	2.51	00	4 57.4	+58 52	10 a	0.85	13	“ “	“ “	32 e	0.91	05
1 57.8	+41 51	10 a	2.85	05	“ “	“ “	16 e	0.60	*12*	7 28.2	+32 6	12 a	6.91	*13*
“ “	“ “	16 e	2.76	*04*	5 6.1	+79 7	13 a	3.69	14	“ “	“ “	16 e	7.17	13
2 29.5	−28 40	10 a	2.76	05	“ “	“ “	26 e	3.41	*14*	7 34.7	−26 34	10 a	0.01	*11*
“ “	“ “	12 e	2.66	*05*	5 7.7	−11 59	16 a	4.87	*14*	“ “	“ “	12 e	0.23	11
2 30.6	+ 5 9	11 a	4.56	*12*	“ “	“ “	4 e	5.15	14	7 41.1	+33 40	14 a	5.55	*01*
“ “	“ “	16 e	4.79	11	5 8.1	+ 2 45	12 a	3.92	12	“ “	“ “	4 e	5.56	00
2 37.4	+48 48	12 a	5.64	01	“ “	“ “	12 e	3.69	*11*	8 6.5	+17 56	12 d	0.93	01
“ “	“ “	16 e	5.62	*01*	5 8.8	+32 35	10 a	2.96	07	“ “	“ “	12 e	0.92	00
2 43.4	+55 29	12 a	4.74	*03*	“ “	“ “	18 e	2.82	*07*	8 10.2	−36 1	8 e	0.91	*09*
“ “	“ “	24 e	4.80	03	5 9.7	− 8 19	10 a	6.25	*07*	“ “	“ “	12 f	1.08	08
2 44.1	+26 51	14 a	5.42	20	“ “	“ “	6 a	6.29	*03*	8 40.6	+29 8	10 a	2.53	12
“ “	“ “	12 e	5.03	*19*	“ “	“ “	8 e	6.42	10	“ “	“ “	24 e	2.29	*12*
2 54.5	−40 42	11 a	1.09	09	5 17.6	+ 3 27	12 a	2.12	01	9 5.7	−29 57	8 e	4.38	10
“ “	“ “	12 f	0.91	*09*	“ “	“ “	18 e	2.10	*01*	“ “	“ “	20 f	4.19	*09*
3 22.4	+55 7	12 a	4.63	09	5 26.9	− 0 23	16 a	4.35	*04*	9 23.7	+63 30	10 a	5.29	*05*
“ “	“ “	14 e	4.45	*09*	“ “	“ “	12 a	4.40	01	“ “	“ “	22 e	5.40	06

R.A. 1900.	Dec. 1900.	No.	Diff.	Res.	R.A. 1900.	Dec. 1900.	No.	Diff.	Res.	R.A. 1900.	Dec. 1900.	No.	Diff.	Res.
h. m.	° ′				h. m.	° ′				h. m.	° ′			
9 26.5	−31 27	8 e	0.81	*05*	14 46.8	+19 31	10 a	2.04	02	17 52.7	−30 14	8 e	1.83	10
" "	" "	31 f	0.91	05	" "	" "	4 e	2.00	*02*	" "	" "	12 f	1.63	*10*
10 3.0	+12 27	10 a	5.59	*71*	15 11.5	+33 41	11 a	4.79	33	17 55.6	+ 2 56	14 a	4.23	17
" "	" "	14 c	7.03	73	" "	" "	22 e	4.14	*32*	" "	" "	8 e	3.90	*16*
" "	" "	26 e	6.27	*03*	15 20.7	+37 44	10 a	2.42	23	17 57.2	+21 36	10 a	0.05	*03*
10 25.0	−30 5	4 e	3.95	15	" "	" "	20 e	1.96	*23*	" "	" "	20 e	0.11	03
" "	" "	16 f	3.64	*16*	15 35.6	+36 58	12 a	0.89	*04*	18 3.8	+26 5	4 d	0.15	07
10 50.2	+25 17	10 a	1.90	11	" "	" "	20 e	0.97	04	" "	" "	18 e	0.00	*08*
" "	" "	18 e	1.68	*11*	15 41.6	+15 44	10 a	6.21	*02*	18 16.1	− 2 55	10 a	7.46	*06*
11 21.7	+ 3 33	10 a	1.03	*01*	" "	" "	8 e	6.25	02	" "	" "	4 e	7.59	07
" "	" "	20 e	1.05	01	15 53.4	−38 6	10 a	4.18	06	18 22.5	+58 45	10 a	2.66	01
11 22.8	+ 3 24	10 a	2.72	16	" "	" "	23 f	4.05	*07*	" "	" "	10 a	2.59	*06*
" "	" "	22 e	2.40	*16*	16 3.2	−32 23	8 e	0.68	*02*	" "	" "	16 e	2.70	05
11 27.3	−28 43	4 e	0.06	*03*	" "	" "	24 f	0.71	01	18 22.5	+58 45	10 a	2.92	05
" "	" "	20 f	0.12	03	16 3.6	+17 19	10 a	1.20	02	" "	" "	4 e	2.82	*05*
11 42.8	+20 46	10 a	4.30	08	" "	" "	32 e	1.17	*01*	18 41.0	+39 34	11 c	0.05	*03*
" "	" "	18 e	4.15	*07*	16 6.2	−19 12	10 a	2.24	04	" "	" "	11 e	0.12	04
12 23.9	+26 28	4 c	1.42	06	" "	" "	8 e	2.17	*03*	18 41.3	+37 30	13 a	1.38	00
" "	" "	18 e	1.31	*05*	16 8.8	−25 13	4 e	3.52	*21*	" "	" "	2 c	1.46	08
12 24.7	−15 58	10 a	5.33	19	" "	" "	8 f	3.94	21	" "	" "	24 e	1.29	*09*
" "	" "	12 e	4.94	*20*	16 10.9	+34 7	16 a	0.85	*05*	18 49.7	+59 16	12 a	3.31	*01*
12 30.1	+18 56	10 a	1.65	11	" "	" "	8 e	0.94	04	" "	" "	26 e	3.34	02
" "	" "	25 e	1.43	*11*	16 13.2	−30 40	8 e	1.36	*01*	19 10.4	+38 58	12 a	3.80	*24*
12 47.2	+17 37	4 d	0.32	*12*	" "	" "	24 f	1.38	01	" "	" "	10 a	4.07	03
" "	" "	16 e	0.55	11	16 17.5	−32 58	8 e	0.64	11	" "	" "	10 b	4.01	*03*
12 51.4	+38 52	10 a	2.63	10	" "	" "	12 f	0.42	*11*	" "	" "	10 c	4.38	34
" "	" "	10 b	2.59	06	16 33.9	+53 8	10 a	1.06	04	" "	" "	18 e	3.93	*11*
" "	" "	10 c	2.40	*13*	" "	" "	14 e	0.98	*04*	19 24.5	+24 28	4 d	1.10	*10*
" "	" "	22 e	2.42	*11*	16 33.9	+53 8	10 a	*0.11*	03	" "	" "	4 e	1.31	11
13 4.8	− 5 0	12 a	3.77	*01*	" "	" "	8 e	*0.16*	*02*	19 26.7	+27 45	12 a	2.14	02
" "	" "	12 e	3.79	01	16 36.0	+49 7	12 a	5.34	*02*	" "	" "	10 a	2.15	03
13 19.9	+55 27	10 a	1.56	00	" "	" "	8 e	5.38	02	" "	" "	10 b	2.09	*03*
" "	" "	10 a	1.66	10	16 41.0	+ 8 46	10 a	3.73	*11*	" "	" "	10 c	2.18	06
" "	" "	10 b	1.71	15	" "	" "	32 e	3.96	12	" "	" "	26 e	2.04	*08*
" "	" "	10 c	1.59	03	17 3.2	+54 36	10 a	0.09	06	19 32.8	+16 14	10 a	3.10	24
" "	" "	56 e	1.30	*26*	" "	" "	8 e	*0.03*	*06*	" "	" "	12 e	2.63	*23*
13 46.0	−32 30	12 e	1.45	00	17 10.1	+14 30	10 a	2.24	16	19 39.1	+50 18	4 d	0.10	*01*
" "	" "	12 f	1.45	00	" "	" "	20 e	1.91	*17*	" "	" "	22 e	0.12	01
14 9.9	+52 16	12 a	2.11	10	17 15.2	−12 45	10 a	4.52	*07*	19 42.6	+33 30	10 a	3.50	14
" "	" "	28 e	1.91	*10*	" "	" "	12 e	4.65	06	" "	" "	22 e	3.21	*15*
14 12.6	+51 50	10 a	3.40	*05*	17 20.2	+37 14	10 a	0.81	*14*	19 44.5	+18 53	10 a	3.67	*03*
" "	" "	20 e	3.50	05	" "	" "	12 e	1.09	14	" "	" "	14 e	3.74	04
14 36.0	+16 51	10 a	0.92	05	17 30.3	+55 14	12 a	*0.04*	*08*	19 48.5	+70 1	10 a	3.16	14
" "	" "	12 e	0.82	*05*	" "	" "	24 e	0.13	09	" "	" "	10 a	2.88	*14*
14 40.2	−25 1	12 e	1.73	*15*	17 39.5	+ 2 37	4 d	0.40	01	19 58.5	+49 49	10 a	3.87	13
" "	" "	12 f	2.03	15	" "	" "	16 e	0.38	*01*	" "	" "	12 e	3.61	*13*
14 40.6	+27 30	11 a	2.41	*01*	17 42.5	+27 47	10 a	6.21	01	20 12.3	+77 25	10 a	3.68	*01*
" "	" "	10 a	2.44	02	" "	" "	8 e	6.19	*01*	" "	" "	12 e	3.70	01
14 45.3	−15 38	13 a	2.12	*06*	17 43.7	+72 12	10 a	1.18	01	20 14.3	−29 30	12 e	0.96	02
" "	" "	22 e	2.25	07	" "	" "	34 e	1.16	*01*	" "	" "	8 f	0.93	*01*

R.A. 1900.	Dec. 1900.	No.	Diff.	Res.	R.A. 1900.	Dec. 1900.	No.	Diff.	Res.	R.A. 1900.	Dec 1900.	No.	Diff.	Res.
h. m.	° ′				h. m.	° ′				h. m.	° ′			
20 15.4	−15 6	10 c	2.75	*10*	21 9.6	+ 9 36	10 a	5.83	07	21 39.6	+28 18	13 a	1.49	14
" "	" "	12 e	2.95	10	" "	" "	16 e	5.68	*08*	" "	" "	8 e	1.21	*14*
20 41.6	+30 21	11 a	4.79	*11*	21 17.5	+19 23	8 a	5.08	12	22 0.9	+64 8	10 a	1.97	07
" "	" "	16 e	5.02	12	" "	" "	28 e	4.85	*11*	" "	" "	10 e	1.82	*08*
20 42.0	+15 46	10 a	0.99	01	21 19.3	+36 58	4 d	0.22	02	22 23.7	− 0 32	10 a	0.18	01
" "	" "	24 e	0.97	*01*	" "	" "	4 e	0.17	*03*	" "	" "	4 e	0.16	*01*
20 56.4	+47 8	13 a	4.49	13	21 27.4	+70 7	10 a	4.45	*05*	22 25.9	−32 52	10 a	3.50	06
" "	" "	34 e	4.24	*12*	" "	" "	16 e	4.55	05	" "	" "	12 f	3.38	*06*
21 2.4	+38 15	10 a	0.80	09	21 39.3	+ 9 25	10 c	5.88	*09*	23 10.7	− 9 38	10 a	4.63	03
" "	" "	20 e	0.62	*09*	" "	" "	8 e	6.06	09	" "	" "	26 e	4.58	*02*

The average value of the residuals in the last column of Table II is ±0.08, and this value is nearly the same for all the catalogues. No explanation has been found for the large residuals, *71* and 73, in the case of *a* Leonis, R. A. $=10^h\ 3^m.0$. The next largest residual is 34.

The observations made at Arequipa with the double image photometer are given in Table III. The H. R. number of the star, the right ascension for 1900, and the declination for 1900 are given in the first three columns, these quantities being taken from the first, fourth, and fifth columns of Table I. Four sets, of four settings each, were commonly made on each star. The Julian Day, omitting the three left hand figures, 241, is given in the fourth column. The mean of the differences of magnitude found from the four sets and the residuals from the mean are given in the fifth and sixth columns. The residuals found by subtracting the mean of the results given in the fifth column, for each star, from the individual results are given in the seventh column. For instance, the first star, was observed on J. D. 2416747, with the resulting differences in magnitude, in the four sets, 0.14, 0.39, 0.41, and 0.54. The mean of these is 0.37, and the residuals are *23*, 02, 04, and 17. The mean result for the three nights is 0.08, and 0.37 −0.08 = 0.29.

TABLE III.

DOUBLE STARS. AREQUIPA.

H. R.	R A. 1900.	Dec. 1900.	J. D.	Diff.	Residuals.	Res.	H. R.	R.A. 1900.	Dec. 1900.	J. D.	Diff.	Residuals.	Res.
	h. m.	° ′						h. m.	° ′				
127	0 27.0	−63 31	6747	0.37	*23*,02,04,17	29	..	3 36.2	−60 6	7212	1.32	12,30,*12*,*32*	A
			6748	*0.14*	*01*,*15*,*05*,22	*22*	1189	44.9	−37 55	6838	0.50	*18*,07,*08*,19	*11*
			6751	0.01	*15*,22,*03*,*04*	*07*				7219	0.72	*03*,*04*,*09*,14	11
..	28.8	−35 32	7192	1.49	12,00,*28*,17	*03*				7259	0.60	20,*19*,*33*,30	*01*
			7193	1.57	47,17,*05*,*60*	05	..	53.1	−40 13	7219	0.59	*17*,07,01,10	*16*
			7196	1.50	17,12,*36*,07	*02*				7259	0.70	*51*,38,25,*13*	*05*
..	28.8	−55 53	7192	2.29	*17*,08,*26*,34	01				7283	0.95	*18*,*04*,34,*11*	20
			7193	2.30	*14*,08,00,06	02	..	58.6	−54 41	6838	0.09	07,*07*,*17*,16	*23*
			7196	2.25	*22*,*10*,09,22	*03*				7283	0.55	08,29,12,*50*	23
252	48.6	−70 3	6747	0.45	*16*,33,*08*,*08*	*01*	1364	4 16.1	−44 30	7258	3.36	*29*,18,19,*08*	*12*
			6748	0.48	*36*,13,29,*04*	02				7259	3.60	*35*,05,29,00	12
			6751	0.44	15,*07*,*08*,02	*02*	1405	22.3	−57 17	6808	0.39	*26*,18,26,*19*	09
..	59.2	−60 38	7195	*0.24*	*18*,08,*20*,29	03				6835	0.26	14,*04*,*14*,02	*04*
			7208	*0.26*	04,00,*01*,*03*	01				6837	0.24	*44*,14,40,*12*	*06*
			7212	*0.30*	10,05,01,*14*	*03*	..	29.3	−77 54	7219	0.18	*01*,01,*11*,10	04
377	1 12.4	−69 24	7195	2.04	*09*,08,*26*,25	*15*				7258	0.34	*14*,05,22,*11*	20
			7208	2.24	*38*,11,32,*07*	05				7259	*0.11*	*11*,35,09,*33*	*25*
			7212	2.30	*05*,18,29,*40*	11	1475	32.6	−63 2	7258	3.36	*25*,*23*,13,35	*14*
..	18.8	−24 52	7219	1.86	*12*,00,03,08	A				7259	3.64	03,17,*01*,*20*	14
..	21.5	−60 1	7195	1.83	04,*02*,12,*13*	A	..	37.4	−40 3	6838	0.09	*06*,*05*,10,01	*23*
..	22.5	−30 45	7196	2.64	*41*,20,07,14	*26*				7283	0.55	10,*35*,*08*,34	23
			7208	2.98	00,*02*,01,02	08	..	41.1	−50 4	7283	0.88	17,*43*,*05*,32	A
			7212	3.08	15,05,*08*,*10*	18	1563	48.7	−53 38	7219	0.77	03,13,*08*,*07*	10
462	31.6	−30 25	7208	1.14	03,*05*,*08*,11	02				7258	0.70	*42*,18,14,08	03
			7219	1.00	*09*,02,02,05	*12*				7259	0.55	*33*,27,38,*32*	*12*
			7973	1.23	05,*02*,03,*05*	11	..	5 11.6	−36 46	7258	1.72	16,17,*11*,*21*	02
479	35.0	−53 56	6747	1.20	02,08,07,*17*	15				7259	1.68	18,13,*19*,*11*	*02*
			6748	0.96	23,*04*,23,*44*	*09*	..	6 17.6	−35 5	7259	0.97	*02*,28,17,*44*	03
			6808	0.98	*32*,16,16,02	*07*				7283	0.88	*33*,26,11,*06*	*06*
..	35.3	−37 58	7196	1.36	16,17,*03*,*30*	24				7319	0.98	01,*02*,02,*02*	04
			7208	0.90	15,*08*,05,*13*	*22*	..	25.9	−40 18	6838	0.08	*05*,*23*,21,09	*33*
			7212	1.09	*18*,00,06,11	*03*				6953	0.56	09,*07*,*20*,18	15
487	36.0	−56 42	6747	0.17	22,*10*,*25*,13	11				6954	0.60	30,02,*16*,*17*	19
			6748	0.11	*12*,14,07,*08*	05	2384	27.3	−50 10	3679	3.23	*07*,*12*,00,20	22
			6808	*0.19*	*13*,59,*13*,*32*	*25*				“	3.54	*24*,*04*,17,10	53
			7973	0.14	*02*,*08*,*03*,13	08				3686	2.98	*17*,*15*,19,13	*03*
..	52.1	−60 48	7973	0.04	*02*,*06*,00,08	A				3689	3.21	*19*,*16*,07,28	20
..	2 37.0	−60 0	7973	0.12	10,*02*,*10*,01	A				6838	2.83	31,*23*,*22*,15	*18*
814	39.5	−40 58	7219	0.11	*06*,00,09,*04*	*11*				6953	2.67	*17*,01,24,*08*	*34*
			7973	0.34	09,*04*,*21*,15	12				6954	2.64	*03*,04,*08*,06	*37*
..	44.6	−37 49	7212	1.14	*12*,20,*11*,01	A	..	53.0	−25 1	6953	1.78	*24*,*05*,06,21	A
897	54.5	−40 42	6747	1.00	*24*,21,13,*08*	09	2667	7 0.9	−43 28	6808	1.10	06,06,*27*,14	*02*
			6748	1.08	01,*38*,19,20	17				6835	1.19	*16*,*12*,01,27	07
			6808	0.66	10,*02*,*21*,15	*25*				6837	1.06	*04*,00,*02*,06	*06*
..	3 1.4	−51 43	7212	1.56	*55*,*01*,16,41	A	..	2.4	−45 10	6976	1.26	*11*,*01*,03,07	11
..	36.2	−40 40	7212	0.79	*21*,32,*21*,10	A				6978	1.04	*22*,16,27,*20*	*11*

H. R.	R.A. 1900.	Dec. 1900.	J. D.	Diff.	Residuals.	Res.	H. R.	R.A. 1900.	Dec. 1900.	J. D.	Diff.	Residuals.	Res.
	h. m.	° ′						h. m.	° ′				
2736	7 9.6	−70 20	3679	1.87	24,08,00,*33*	*07*	3142	7 56.4	−49 42	6568	0.54	15,*09*,08,*13*	41
			"	2.01	*23*,*34*,33,25	07				6571	0.02	*16*,11,*04*,11	*11*
			"	2.04	*14*,*34*,14,32	10				"	0.26	*13*,*07*,10,11	13
			3684	2.30	*16*,*02*,15,03	36				6598	0.32	*31*,15,14,04	19
			3686	2.14	*08*,*13*,18,03	20				6599	*0.04*	*05*,67,*49*,*11*	*17*
			3689	2.10	*26*,*14*,40,*01*	16				8080	*0.02*	03,08,02,*13*	*15*
			6568	2.02	48,*31*,*07*,*11*	08				8081	*0.04*	06,*05*,*01*,01	*17*
			6569	2.33	*07*,40,*32*,00	39				8082	0.02	*04*,00,04,*02*	*11*
			6570	1.30	*04*,12,*31*,22	*64*	..	8 2.0	−45 7	6593	0.22	*08*,19,03,*13*	*14*
			"	2.12	06,*34*,15,12	18				6954	0.44	00,*04*,*11*,15	08
			6571	1.62	*30*,*06*,*08*,46	*32*				6982	0.43	*21*,*01*,15,06	07
			"	0.95	*18*,39,*23*,02	R	..	2.8	−40 3	6982	0.27	12,*30*,00,19	*09*
			6572	1.72	*19*,01,02,16	*22*				6983	0.14	*13*,13,*06*,08	*22*
			"	1.60	36,12,*47*,*02*	*34*				6984	0.68	*17*,*12*,17,13	32
..	12.2	−45 0	6976	*0.14*	*02*,06,06,*10*	03	..	4.9	−50 10	6976	0.43	04,*22*,*05*,22	*04*
			6978	*0.20*	19,*09*,*02*,*07*	*03*				6978	0.28	*06*,10,*27*,23	*19*
2813	17.9	−52 8	6568	0.91	*12*,08,26,*23*	28				6983	0.71	*10*,03,08,*02*	24
			6569	0.65	*15*,19,00,*05*	02	3207	6.5	−47 2	7682	2.10	*47*,22,68,*41*	A
			6571	0.40	09,*31*,24,*04*	*23*	3240	10.2	−36 1	6598	1.07	40,*01*,*07*,*31*	*01*
			"	0.72	07,13,*04*,*17*	09				6599	1.04	01,12,*10*,*04*	*04*
			6572	0.60	01,*01*,*13*,11	*03*				6600	1.12	*10*,30,*10*,*09*	04
			"	0.43	55,*21*,*51*,17	*20*	3242	10.4	−35 11	3686	4.35	01,*03*,*26*,27	*21*
			6598	0.68	07,*14*,11,*04*	05				3689	4.78	*05*,12,*30*,22	22
..	20.4	−29 57	6976	1.24	*05*,12,00,*06*	17	3266	14.5	−35 9	3686	3.62	*21*,05,33,*17*	*44*
			6978	1.09	*14*,07,02,04	02				3689	3.90	40,13,*15*,*40*	*16*
			7319	0.89	*08*,*52*,07,53	*18*				6982	4.25	30,*39*,03,05	19
2843	21.3	−37 6	6568	0.20	06,*04*,03,*04*	12				6983	4.34	*17*,03,34,*19*	28
			6569	0.05	03,*03*,*12*,13	*03*				6984	4.20	14,15,10,*38*	14
			6573	*0.09*	*11*,*04*,07,08	*17*	3327	22.6	−38 44	6598	0.88	16,*27*,07,04	28
			6598	0.28	26,*45*,06,13	20				6599	0.33	49,03,*48*,*03*	*27*
			6599	*0.02*	*03*,*17*,*05*,23	*10*				6600	0.58	27,11,*19*,*18*	*02*
2870	25.1	−31 38	6568	1.20	*10*,09,*11*,13	32	3359	26.0	−44 23	7323	1.44	18,*10*,*33*,26	A
			6573	0.69	10,*03*,*03*,*03*	*19*	3582	54.5	−58 51	7682	1.67	19,*40*,*13*,35	A
			6598	0.98	*07*,17,12,*21*	10	3644	9 5.7	−29 57	3679	4.75	*05*,11,*16*,09	56
			6599	0.66	*11*,20,21,*28*	*22*				3684	5.83	03,*16*,*11*,25	R
2979	37.4	−74 3	8080	0.09	*06*,01,05,*01*	07				3686	5.14	*26*,*52*,04,76	R
			8081	*0.01*	17,04,*18*,*04*	*03*				3689	4.20	20,07,*11*,*16*	01
			8082	*0.02*	*01*,*02*,*01*,02	*04*				3968	3.68	37,99,*22*,*26*	*51*
..	38.2	−29 57	6976	2.56	06,*19*,10,03	16				6976	3.89	11,*02*,*05*,*03*	*30*
			6978	2.16	28,*32*,06,*04*	*24*				6978	4.43	*24*,19,12,*07*	24
			7319	2.47	*27*,24,28,*26*	07	..	24.8	−45 3	6953	0.49	01,*21*,13,06	*01*
..	40.4	−30 1	6976	1.78	*22*,17,07,*03*	09				6954	0.44	01,*12*,*11*,22	*06*
			6978	1.66	*04*,*27*,*08*,39	*03*				6982	0.56	*27*,*16*,32,09	06
			7319	1.62	55,*48*,*16*,09	*07*	3781	26.5	−31 27	3679	0.85	*14*,*12*,13,14	*06*
..	48.7	−30 13	6976	0.49	*05*,06,00,00	08				3684	0.86	*15*,*18*,*02*,34	*05*
			6978	0.44	*17*,10,19,*13*	03				3686	0.92	06,06,04,*16*	01
			7319	0.29	10,01,*15*,03	*12*				3689	1.00	*26*,*19*,21,23	09
..	52.4	−25 9	6953	1.85	*34*,06,15,14	24				6568	1.04	*55*,*03*,44,14	13
			6954	1.42	08,34,*24*,*16*	*19*				6598	0.92	22,*10*,*13*, R	01
			6982	1.55	*07*,12,01,*06*	*06*				6599	1.20	17,39,*68*,12	29

H. R.	R A. 1900.	Dec. 1900.	J. D.	Diff.	Residuals.	Res.
	h. m.	° ′				
			6600	0.46	*14*,43,*16*,*13*	*45*
..	9 41.4	−49 2	7007	0.21	*01*,06,*14*,08	22
			7009	*0.08*	07,*11*,02,04	*07*
			7011	*0.16*	12,20,*29*,*03*	*15*
3890	44.6	−64 36	7007	2.86	*06*,14,*12*,05	*02*
			7009	2.90	*21*,01,17,01	02
..	45.3	−30 16	6968	0.34	*15*,*22*,13,22	*02*
			6976	0.48	*25*,07,23,*04*	12
			6978	0.27	20,*30*,*02*,13	*09*
..	45.7	−85 33	6953	0.48	*08*,12,09,*13*	*14*
			6954	0.52	*02*,11,13,*24*	*10*
			6982	0.76	19,*32*,*06*,19	14
			7007	0.48	*01*,06,09,*14*	*14*
			7009	0.83	*05*,02,07,*03*	21
			7011	0.64	13,16,*19*,*08*	02
3898	46.1	−45 16	3679	3.66	64,*12*,*01*,*51*	06
			3684	3.83	04,38,*07*,*34*	23
			3686	5.50	*45*,*35*,52,28	R
			3689	3.82	18,19,03,*41*	22
			6598	4.81	R *10*,12,*01*	R
			6599	3.78	R 68,*47*,*20*	18
			6600	2.92	20,12,*15*,*15*	*68*
3925	50.4	−44 49	7007	2.02	*10*,09,17,*15*	*11*
			7009	2.24	04,11,*02*,*14*	11
..	50.7	−35 9	6968	0.66	*13*,*07*,05,16	03
			6976	0.50	*06*,29,*08*,*17*	*13*
			6978	0.72	05,*15*,02,10	09
4074	10 17.2	−55 33	7007	3.41	17,*01*,*23*,07	02
			7009	3.06	*01*,*36*,02,33	*33*
			8102	3.70	*01*,*02*,02,03	31
..	17.2	−55 33	7007	5.16	38,00,09,*49*	38
			7009	4.59	25,*32*,*17*,25	*19*
			8102	4.58	02,*10*,*01*,08	*20*
..	18.0	−30 10	6968	1.27	*20*,14,20,*13*	*24*
			6976	1.61	00,*12*,04,08	10
			6978	1.65	*05*,02,*16*,18	14
4118	25.0	−30 5	3679	5.44	*15*,15,*13*,14	R
			3684	4.41	*14*,14,*11*,11	R
			3689	4.78	*05*,40,*26*,*11*	R
			6968	3.54	30,*06*,*12*,*13*	*10*
			6976	3.58	*34*,37,*02*,*01*	*06*
			6978	3.74	05,05,06,*15*	10
			7009	3.68	*13*,*19*,28,06	04
4134	27.5	−53 13	8102	3.37	*14*,*01*,19,*05*	01
			8103	3.36	*21*,22,18,*19*	00
4136	27.7	−44 33	3679	0.33	*05*,*09*,13,00	*03*
			3684	0.35	10,13,*11*,*12*	*01*
			3689	0.40	*12*,*15*,10,19	04
			6600	0.22	06,*39*,16,18	*14*
			6627	0.74	*21*,*11*,27,07	38
	h. m.	° ′				
			6628	0.04	36,*17*,*33*,16	*32*
			8102	0.42	04,02,*10*,05	06
			8103	0.34	*03*,05,*02*,*01*	*02*
4143	10 28.8	−46 30	8102	3.67	04,*15*,08,03	A
..	29.4	−54 53	6953	0.88	*21*,30,07,*15*	*03*
			6954	1.02	*24*,06,08,10	11
			6982	0.82	*12*,*09*,28,*09*	*09*
..	41.4	−55 16	6968	2.19	*13*,01,24,*11*	*46*
			6976	2.80	02,*27*,22,02	15
			6978	2.96	*20*,09,01,08	31
4257	49.4	−58 19	7011	3.92	01,19,*23*,04	*21*
			7012	4.14	*22*,28,25,*29*	01
			7013	4.32	*06*,13,08,*16*	19
..	50.7	−34 58	6968	1.78	*07*,*05*,07,03	*06*
			6976	1.85	*15*,15,06,*05*	01
			6978	1.90	*11*,14,13,*18*	06
..	53.8	−68 30	7380	2.10	*09*,*05*,26,*13*	A
..	58.3	−59 59	6968	0.19	11,03,*24*,11	17
			6976	*0.09*	12,*05*,00,*07*	*11*
			6978	*0.03*	07,*14*,01,05	*05*
..	11 0.6	−60 0	6968	0.50	*14*,*09*,*12*,35	*03*
			6976	0.61	35,*23*,*23*,10	08
			6978	0.48	22,*12*,*24*,16	*05*
..	5.9	−60 13	7000	0.72	12,*25*,05,08	04
			7004	0.78	00,14,*16*,04	10
			7007	0.54	07,*02*,04,*10*	*14*
..	5.9	−60 13	7000	0.09	34,*19*,*06*,*08*	*15*
			7004	0.47	14,00,*17*,04	23
			7007	0.16	09,01,08,*16*	*08*
..	6.7	−60 12	7000	0.21	06,*06*,*08*,09	*02*
			7004	0.33	21,*16*,02,*07*	10
			7007	0.14	05,20,*15*,*08*	*09*
..	7.4	−59 54	6953	0.87	*17*,*07*,16,09	23
			6954	0.49	*12*,*09*,06,14	*15*
			6982	0.56	*27*,13,21,*08*	*08*
4370	11.9	−45 20	8080	0.26	08,02,01,*13*	*02*
			8102	0.30	01,*01*,00,00	02
..	17.8	−60 14	6968	0.16	13,*02*,01,*14*	*03*
			6976	0.46	15,02,*21*,02	27
			6978	*0.04*	29,*28*,*37*,35	*23*
4401	19.1	−64 24	8080	1.18	07,*05*,*03*,00	A
..	22.2	−50 10	6953	0.42	00,*13*,03,12	*01*
			6954	0.27	02,03,18,*23*	*16*
			6982	0.59	*03*,*01*,27,*24*	16
..	22.7	−45 14	7000	0.78	*25*,*20*,16,30	02
			7004	0.56	*01*,*03*,24,*19*	*20*
			7007	0.95	*10*,*20*,*02*,31	19
4423	23.8	−42 7	7380	2.55	*50*,13,25,13	*03*
			8102	2.62	09,*01*,*08*,02	04
4441	27.1	−58 53	6600	0.35	*41*,15,15,11	04

H. R.	R.A. 1900.	Dec. 1900.	J. D.	Diff.	Residuals.	Res.
	h. m.	° ′				
			6601	0.30	*28*,*09*,25,12	*01*
			6627	0.29	09,*26*,00,16	*02*
4444	11 27.3	−28 43	7011	0.05	*04*,12,03,*10*	*07*
			7012	0.14	19,*14*,*12*,08	02
			8080	0.09	04,*11*,*03*,10	*03*
			8081	0.13	04,*05*,*07*,08	01
			8082	0.20	*08*,04,*01*,04	08
..	34.4	−57 11	7380	1.27	*40*,26,30,*15*	A
..	35.1	−62 55	7011	0.88	21,09,*18*,*12*	16
			7012	0.92	*18*,23,09,*13*	20
			7013	0.32	*14*,02,16,*03*	*40*
			8080	0.74	14,*09*,01,*04*	02
..	56.8	−60 13	7000	1.48	*11*,03,02,06	01
			7004	1.71	12,23,*05*,*29*	24
			7009	1.22	*12*,05,11,*02*	*25*
4615	12 1.2	−65 9	6953	1.76	03,10,*04*,*11*	02
			6954	1.94	10,*05*,*18*,12	20
			6982	1.82	*11*,04,03,05	08
			7009	1.46	*11*,08,16,*12*	*28*
..	7.7	−70 13	7000	0.45	06,*16*,*01*,12	08
			7004	0.45	*03*,27,13,*37*	08
			7007	0.22	*41*,34,28,*19*	*15*
4652	8.8	−45 10	8080	1.21	01,01,*09*,08	A
..	9.5	−55 14	7000	1.16	*01*,*09*,09,01	03
			7004	1.05	*40*,10,13,16	*08*
			7007	1.18	*06*,*20*,39,*11*	05
4730	21.0	−62 33	3677	0.52	16,*19*,02,00	01
			3678	0.57	*15*,08,01,07	06
			3678	0.86	*26*,06,31,*13*	35
			3678	0.18	*56*,*11*,50,17	*33*
			3678	0.64	*01*,05,*16*,12	13
			3684	0.48	*03*,06,05,*10*	*03*
			3684	0.40	06,01,*05*,*04*	*11*
			3689	0.47	*05*,27,*26*,05	*04*
			3689	0.50	14,17,*39*,08	*01*
			6657	1.12	*03*,07,*02*,*02*	61
			6657	0.65	02,14,13,*29*	14
			6659	0.32	*23*,24,43,*42*	*19*
			6660	0.26	03,*16*,*06*,19	*25*
			7779	0.42	08,10,*09*,*09*	*09*
			7783	0.20	09,49,10,*66*	*31*
			7784	0.63	01,*09*,*32*,41	12
4763	25.6	−56 33	7011	4.70	*18*,*07*,04,20	*24*
			7012	5.26	*37*,15,*10*,33	32
			7013	5.38	*37*,10,30,*01*	44
			7779	4.70	09,*03*,*17*,09	*24*
			7783	4.78	*06*,*03*,02,09	*16*
			7784	4.83	*17*,11,*06*,11	*11*
4898	48.8	−56 38	6601	1.46	*17*,03,00,14	55
			6627	0.55	*04*,*37*,38,02	*36*
			6628	0.44	*07*,*08*,*06*,20	*47*
			7779	1.01	07,*03*,*17*,12	10
			7783	0.92	19,*14*,*22*,19	01
			7784	1.10	14,*02*,*16*,04	19
..	12 55.6	−33 5	7011	1.26	03,*20*,*17*,32	09
			7012	1.06	12,13,*04*,*23*	*11*
			7013	1.18	30,04,*05*,*31*	01
4952	13 1.7	−64 46	7380	1.45	*01*,26,11,*37*	A
5035	16.2	−60 28	6601	1.54	29,03,*19*,*11*	14
			6627	1.25	*19*,15,19,*16*	*15*
			6628	1.40	*23*,*01*,25, R	00
..	29.5	−35 8	7000	0.38	26,03,*01*,*27*	11
			7004	0.36	07,*12*,21,*18*	09
			7007	0.08	06,05,*22*,13	*19*
..	31.7	−35 12	7000	0.67	*63*,20,07,36	15
			7004	0.58	*09*,25,16,*34*	06
			7007	0.42	02,*22*,*14*,36	*10*
			8102	0.39	*02*,*02*,11,*07*	*13*
..	31.7	−50 6	7000	3.26	*01*,*01*,*01*,02	*17*
			7004	3.34	05,*01*,02,*07*	*09*
			7007	3.69	10,*13*,*10*,12	26
..	33.5	−60 3	6982	0.76	32,*09*,*31*,09	16
			6983	0.53	*32*,06,27,*01*	*07*
			6984	0.51	*27*,12,05,09	*09*
..	34.2	−45 12	7000	0.56	13,00,*14*,*01*	*04*
			7004	0.71	*02*,01,08,*07*	11
			7007	0.54	*38*,07,37,*05*	*06*
5141	35.4	−54 3	6601	1.32	24,*07*,*19*,02	*13*
			6627	1.52	10,40,*31*,*18*	07
			6628	1.50	26,04,*20*,*08*	05
..	42.2	−61 37	7009	0.26	*05*,*32*,22,14	*16*
			7012	0.59	*06*,*04*,*21*,31	17
			7013	0.41	16,*30*,*07*,21	*01*
5189	43.1	−35 12	7009	3.07	04,*01*,*13*,11	27
			7058	2.62	*06*,*02*,*15*,21	*18*
			7402	2.72	25,*27*,*13*,15	*08*
5207	45.6	−52 19	7009	2.02	14,*05*,*03*,*05*	*14*
			7012	2.26	*12*,08,*01*,03	10
			7013	2.19	15,*14*,*11*,09	03
5210	46.0	−32 30	6601	1.37	30,16,*20*,*27*	*08*
			6627	1.32	09,11,*46*,27	*13*
			6628	1.66	*06*,04,08,*08*	21
..	47.1	−66 25	7009	0.79	05,19,00,*24*	*05*
			7012	0.79	*13*,*09*,*22*,43	*05*
			7013	0.94	08,16,00,*22*	10
..	48.3	−50 12	6982	0.18	*13*,13,*23*,22	*10*
			6983	0.36	*16*,19,06,*07*	08
			6984	0.30	13,*24*,03,07	02
..	50.4	−25 2	7058	0.84	06,03,12,*19*	*12*
			7402	1.07	*10*,13,04,*07*	11

H. R.	R.A. 1900.	Dec. 1900.	J. D.	Diff.	Residuals.	Res.	H. R.	R.A. 1900.	Dec. 1900.	J. D.	Diff.	Residuals.	Res.
	h. m.	° ′						h. m.	° ′				
..	14 1.0	−53 13	7009	0.49	*31*,24,13,*07*	01				6628	2.80	*15*,32,*27*,09	23
			7012	0.49	10,*18*,*12*,19	01				6629	2.39	*29*,*22*,22,29	*18*
			7013	0.46	00,30,13,*42*	*02*	..	15 14.7	−60 0	7058	0.32	*30*,37,18,*24*	*10*
5371	15.5	−58 0	7011	2.00	*02*,02,*02*,03	05				7080	0.64	*14*,*01*,09,04	22
			7012	1.88	08,03,03,*12*	*07*				7451	0.30	26,*11*,*36*,21	*12*
			7013	1.97	11,*19*,00,09	02	5708	15.9	−44 20	7402	5.12	04,*33*,*17*,47	02
..	24.0	−25 6	7058	1.66	*04*,12,00,*09*	*13*				7809	5.07	*12*,11,09,*09*	*03*
			7402	1.92	*23*,18,25,*18*	13	..	17.3	−65 0	7058	0.40	20,*07*,*10*,*01*	17
..	28.1	−30 11	7058	0.15	*15*,14,11,*09*	A				7080	0.26	*11*,12,28,*28*	03
5459	32.8	−60 25	3677	1.31	25,00,*49*,23	*06*				7451	0.03	13,17,*04*,*25*	*20*
			3678	1.41	06,37,*35*,*07*	04	..	23.7	−41 34	7402	1.52	15,*45*,00,32	*03*
			3678	0.90	08,21,*13*,*15*	*47*				7454	1.51	08,*12*,*12*,15	*04*
			3678	1.10	28,*08*,*25*,06	*27*				7455	1.62	31,*27*,12,*18*	07
			3678	1.25	53,*10*,02,*45*	*12*	..	24.8	−57 4	7809	1.52	07,*02*,*03*,00	A
			3678	1.69	08,*01*,*15*,08	32	..	26.7	−40 9	7058	4.13	09,*37*,14,14	R
			3678	1.84	*01*,16,05,*21*	47				7080	3.54	18,15,16,*51*	23
			3689	1.24	26,*18*,*08*,*02*	*13*				7451	3.05	22,20,*09*,*32*	*26*
			3689	1.32	34,03,*38*,*01*	*05*				7779	3.21	21,*15*,*03*,*02*	*10*
			6601	0.82	13,12,*21*,*04*	*55*				7786	3.40	28,*17*,*23*,12	09
			6627	1.40	*17*,*21*,*01*,37	03				7783	3.35	26,*20*,00,*06*	04
			6628	0.39	17,09,*05*,*22*	R	..	35.0	−57 48	7809	2.22	*08*,12,03,*08*	A
			6629	0.08	08,*10*,*03*,07	R	5846	37.7	−41 30	6657	1.54	*06*,13,*02*,*06*	12
			7779	1.62	*30*,*20*,29,19	25				6659	1.77	06, R *16*,11	35
			7783	1.76	*18*,30,*19*,08	39				6660	1.32	R *23*,14,08	*10*
			7784	1.56	*23*,22,32,*30*	19				7779	1.44	10,*25*,07,07	02
5463	34.4	−64 32	7011	5.44	07,*14*,*19*,28	03				7783	1.14	01,*35*,37,*01*	*28*
			7012	5.51	*05*,*03*,28,*21*	10				7786	1.30	14,*39*,*31*,57	*12*
			7013	5.27	40,*23*,*22*,04	*14*	5851	38.7	−65 8	7809	*0.04*	*04*,14,*03*,*05*	A
..	35.6	−54 45	7011	0.33	*10*,04,*13*,19	20	..	40.6	−35 12	6982	0.60	*28*,00,*11*,40	*02*
			7012	0.04	21,*17*,*16*,11	*09*				6983	0.60	*49*,32,15,03	*02*
			7013	0.02	28,*23*,04,*07*	*11*				6984	0.65	04,*12*,*18*,26	03
5497	40.2	−25 1	6982	2.10	*02*,16,*19*,05	07	..	47.4	−50 3	6982	1.00	03,*05*,*04*,07	26
			6983	1.98	*32*,07,*02*,26	*05*				6983	0.58	*09*,*06*,*05*,22	*16*
			6984	2.00	*08*,03,*26*,31	*03*				6984	0.65	*04*,22,*04*,*15*	*09*
..	41.3	−70 7	7058	1.22	*03*,03,16,*17*	03	5925	50.5	−33 40	6627	0.10	*15*,61,02,*48*	*26*
			7451	1.32	*10*,*10*,09,10	13				6628	0.50	14,11,*18*,*07*	14
			7452	1.02	10,*34*,*13*,39	*17*				6629	0.12	*20*,*17*,19,18	*24*
..	53.5	−30 19	7452	1.72	*13*,*05*,14,05	*19*				7779	0.38	04,*24*,05,16	02
			7454	1.99	*06*,35,*18*,*12*	08				7783	0.40	*32*,04,27,02	04
			7455	2.01	19,*05*,16,*30*	10				7786	0.65	13,08,*15*,*05*	29
5646	5.0	−48 22	6601	1.55	*07*,14,*25*,18	*14*	5948	53.4	−38 6	6747	3.87	*21*,25, R *05*	*18*
			6627	1.61	*12*, R *25*,37	*08*				7402	4.14	*11*,26,01,*14*	09
			6628	1.90	07,31,10,*46*	21				7452	3.89	14,*15*,*02*,04	*16*
5649	15 5.1	−51 43	7452	3.28	32,*18*,*13*,*02*	05				7779	4.06	29,21,*36*,*12*	01
			7454	3.26	*17*,15,*18*,22	03				7783	4.12	15,*03*,17,*29*	07
			7455	3.16	04,*05*,*09*,11	*07*				7786	4.24	40,*05*,*31*,*04*	19
..	7.9	−43 1	7452	0.98	*33*,*02*,52,*17*	04	5952	54.2	−40 9	7058	3.78	*07*,41,*09*,*25*	06
			7454	1.11	*12*,31,01,*20*	17				7402	3.65	*04*,41,*10*,*27*	*07*
			7455	0.74	*17*,24,23,*30*	*20*	..	55.2	−60 13	7011	1.06	07,*15*,*12*,20	06
5683	11.5	−47 31	6627	2.51	*20*,09,*03*,13	*06*				7012	1.00	24,*15*,*08*,00	00

H. R.	R.A. 1900.	Dec. 1900.	J. D.	Diff.	Residuals.	Res.	H. R.	R.A. 1900.	Dec. 1900.	J. D.	Diff.	Residuals.	Res.
	h. m.	° ′						h. m.	° ′				
			7013	0.95	06,08,*11*,*02*	*05*	6426	17 12.1	−34 53	6747	4.15	R *17*,*10*,27	*19*
5961	15 55.4	−57 29	7452	3.08	09,03,*05*,*06*	06				7080	4.20	40,*14*,*20*,*07*	*14*
			7454	2.99	05,*16*,*15*,25	*03*				7109	4.66	03,17,19,*38*	32
			7455	2.98	*02*,02,*07*,09	*04*				7809	4.33	08,*04*,*15*,10	*01*
6006	16 3.2	−32 23	6628	0.76	13,57,*34*,*34*	05	..	21.8	−43 54	7454	2.45	19,*37*,*20*,37	11
			6629	0.79	06,*26*,03,16	08				7455	2.23	34,*33*,*32*,31	*11*
			6659	0.68	*29*,17,*24*,37	*03*	..	36.8	−29 53	7495	0.70	*18*,14,*04*,09	*01*
			7779	0.51	22,*24*,*15*,17	*20*				7496	0.76	08,43,*20*,*32*	05
			7783	0.63	*17*,37,07,*26*	*08*				7497	0.66	06,*27*,20,00	*05*
			7786	0.88	10,09,02,*22*	17	..	37.6	−45 8	7080	0.65	*29*,32,07,*10*	*09*
6054	8.8	−25 13	7058	3.84	*02*,*26*,*03*,31	*10*				7496	0.74	*10*,42,16,*50*	00
			7080	4.04	*11*,14,26,*27*	10				7497	0.84	*15*,11,18,*14*	10
6077	13.2	−30 40	6628	1.26	*34*,*19*,60,*09*	*12*	..	44.4	−35 2	7454	1.62	*26*,23,06,*04*	06
			6629	1.66	14,*27*,*03*,15	28				7455	1.39	*18*,*02*,09,10	*17*
			6659	1.42	08,*16*,23,*14*	04				7497	1.67	*18*,01,25,*07*	11
			7779	1.57	02,07,*14*,06	19	6691	52.1	−36 51	7100	2.22	*03*,02,*09*,10	*08*
			7783	1.14	00,26,07,*31*	*24*				7101	2.41	*12*,19,*07*,01	11
			7786	1.20	*32*,*25*,06,52	*18*				7103	2.26	*07*,08,06,*08*	*04*
6085	15.5	−43 41	7452	3.38	12,*17*,*05*,10	*15*	6693	52.7	−30 14	6629	1.74	09,38,*25*,*21*	11
			7454	3.48	44,*20*,*27*,03	*05*				6659	1.76	*17*,*17*,14,21	13
			7455	3.73	*18*,*25*,05,38	20				6660	1.40	*06*,39,*17*,*16*	*23*
6097	17.5	−32 58	6629	0.38	*05*,*24*,29,01	*04*	..	57.4	−40 1	7495	0.82	15,*14*,*08*,09	*03*
			6659	0.43	*34*,*11*,40,04	01				7496	0.85	*14*,25,*02*,*09*	00
			6660	0.44	02,*05*,*24*,25	02				7497	0.88	23,*10*,11,*26*	03
6115	19.8	−47 20	6629	2.68	*23*,*02*,11,16	02	..	18 8.5	−70 8	7100	1.54	*05*,24,*03*,*17*	17
			6659	2.81	02,13,*04*,*11*	15				7101	1.24	*15*,*02*,08,09	*13*
			6660	2.50	04,*11*,03,03	*16*				7103	1.32	*16*,*05*,24,*01*	*05*
..	26.3	−29 59	7080	0.28	34,*18*,*23*,05	04	..	25.8	−29 56	7495	0.36	18,*25*,*05*,10	08
			7452	0.19	00,*03*,*51*,55	*05*				7496	0.24	*19*,40,*04*,*18*	*04*
6174	31.4	−43 12	7402	3.06	*08*,*13*,16,05	A				7497	0.25	*18*,10,11,*02*	*03*
6187	33.9	−48 34	6629	1.50	*10*,21,*04*,*07*	28	6953	26.5	−38 47	6659	0.71	*05*,*18*,*04*,28	11
			6659	1.02	08,*32*,*08*,32	*20*				6660	0.50	15,*27*,*13*,27	*10*
			6660	1.15	10,*13*,*22*,24	*07*				6687	0.60	07,*21*,03,11	00
..	41.5	−36 42	7100	1.16	*17*,11,07,*03*	09	..	27.8	−34 53	7845	0.19	*06*,*04*,18,*08*	A
			7101	0.96	*22*,15,17,*09*	*11*	7012	35.7	−64 58	6747	4.55	*08*,22,*10*,*03*	A
			7103	1.08	*04*,20,00,*18*	01	7170	54.3	−37 12	6659	0.38	11,00,*07*,*04*	15
6236	43.0	−49 52	7809	0.01	*02*,05,*21*,17	A				6660	0.07	04,*22*,17,00	*16*
6244	44.3	−37 21	7454	2.24	13,19,11,*41*	22				6687	0.20	07,*11*,*08*,10	*03*
			7455	1.60	*01*,17,*21*,04	*42*				7845	0.25	*08*,04,*06*,09	02
			7779	1.80	*11*,01,*03*,13	*22*				8203	0.24	08,*08*,*11*,09	01
			7783	1.77	*32*,14,24,*07*	*25*	..	19 6.1	−34 1	7100	0.50	*08*,01,22,*16*	*17*
			7786	2.50	08,*31*,*14*,37	48				7101	0.68	*19*,24,15,*22*	01
			7809	2.20	*05*,00,*01*,04	18				7103	0.83	03,01,*06*,01	16
..	54.4	−54 55	7080	1.71	04,01,06,*12*	A	7337	15.4	−44 39	6659	3.04	*05*,*03*,*27*,34	09
..	55.2	−50 0	7100	1.04	08,03,01,*11*	08				6660	2.84	23,*33*,*05*,14	*11*
			7101	0.84	26,*07*,*19*,*01*	*12*				6687	2.96	*09*,06,18,*16*	01
			7103	1.00	*16*,28,*18*,04	04	7548	44.7	−55 13	6659	0.44	*03*,07,*08*,03	*15*
..	17 2.9	−46 36	7454	1.41	08,*10*,*17*,18	*06*				6660	0.65	11,*11*,12,*11*	06
			7455	1.50	18,*19*,00,01	03				6687	0.68	02,05,11,*16*	09
			7809	1.49	00,03,*05*,02	02	..	20 11.2	−40 30	8203	0.17	*03*,13,09,*18*	A

H. R.	R.A. 1900.	Dec. 1900.	J. D.	Diff.	Residuals.	Res.
	h. m.	° ′				
7764	20 14.3	−29 30	7109	0.92	11,*24*,*01*,12	*01*
			8203	0.94	20,*29*,04,07	01
7864	29.8	−75 42	6659	0.58	*10*,14,00,*03*	06
			6660	0.57	09,05,*19*,06	05
			6687	0.41	*30*,*03*,00,34	*11*
..	30.9	−64 57	7109	1.33	*11*,02,12,*03*	16
			7495	0.84	*22*,15,01,05	*33*
			7497	1.35	43,*23*,*28*,09	18
..	34.2	−42 45	7109	3.77	02,*25*,04,20	*05*
			8203	3.88	*11*,07,12,*07*	06
7965	43.8	−34 9	7109	5.14	54,19,*29*,*44*	18
			7906	4.83	*01*,*08*,*04*,13	*13*
			8203	4.90	16,*13*,*23*,22	*06*
..	21 6.1	−31 0	7906	1.74	02,*21*,02,16	A
..	9.2	−39 52	7495	1.13	06,*30*,*25*,49	00
			7496	0.96	*12*,21,12,*20*	*17*
			7497	1.30	*17*,28,12,*25*	17
..	33.6	−29 55	7109	0.99	03,42,*37*,*08*	*19*
			7496	1.14	*05*,*01*,02,02	*04*
			7497	1.40	01,*15*,*22*,38	22
8323	41.7	−47 45	8203	2.96	03,*04*,06,*03*	A
8326	41.9	−31 21	7906	6.02	*15*,05,06,06	*07*
			8203	6.16	02,02,07,*11*	07
..	22 9.6	−80 57	7109	*0.42*	00,24,*05*,*19*	09
			7195	*0.32*	18,23,22,*63*	*01*
			7196	*0.26*	*12*,*11*,39,*16*	*07*
8526	17.1	−75 31	7196	2.38	*05*,*42*,25,21	A
8560	23.8	−44 15	7192	5.21	*04*,06,07,*08*	10
			7193	5.01	*15*,*50*,08,56	*10*
	h. m.	° ′				
8576	22 25.9	−32 52	6747	3.29	07,*06*,*05*,04	*09*
			6748	3.28	03,*09*,04,03	*10*
			7192	3.56	01,*21*,14,08	18
..	52.8	−85 4	7195	*0.26*	09,20,*16*,*14*	*16*
			7196	0.06	15,*06*,11,00	16
8793	23 1.5	−51 14	6747	0.59	32,*25*,*17*,11	*08*
			6748	0.95	13,*32*,02,18	28
			6751	0.48	*16*,07,05,05	*19*
..	2.5	−60 17	7192	2.15	*34*,23,15,*04*	06
			7193	1.96	*06*,19,*16*,04	*13*
			7196	2.16	*05*,*12*,29,*13*	07
8877	15.2	−50 51	7192	2.72	*29*,01,12,17	05
			7193	2.79	*07*,25,*13*,*05*	12
			7196	2.49	11,*08*,*14*,11	*18*
8895	18.2	−54 22	6747	0.98	10,06,*29*,11	09
			6748	1.01	29,02,*26*,*05*	12
			6751	0.68	*19*,10,07,01	*21*
..	25.0	−69 38	7192	2.22	*17*,08,21,*11*	16
			7193	2.05	13,20,*17*,*17*	*01*
			7195	1.91	*05*,07,*10*,07	*15*
8966	34.1	−47 12	7219	0.57	00,19,*10*,*09*	A
..	48.6	−29 58	7192	3.17	24,*27*,28,*24*	17
			7193	3.29	*38*,*18*,21,34	29
			7196	2.47	41,*16*,*38*,13	*53*
			8203	3.05	*16*,*01*,07,11	05
9077	55.2	−44 51	6747	3.59	*07*,01,*06*,11	07
			6748	3.45	*19*,*03*,14,07	*07*
			7195	3.53	*01*,04,10,*12*	01

REMARKS.

2736. Observations on different nights discordant. Second observation on J. D. 6571 rejected for discordance. Residual *99*.

3644. Observations on different nights discordant. Observations on J. D. 3684 and 3686 rejected for discordance. Residuals 164 and 95, respectively.

3781. Fourth set on J. D. 6598 rejected. Settings in wrong quadrant.

3898. Observations on different nights discordant. Observations on J. D. 3686 and 6598 rejected for discordance. Residuals 190 and 121, respectively. First set on J. D. 6599 rejected. Settings in wrong quadrant.

4118. The early observations do not agree with those taken later, and have been rejected.

4730. The observations of this star on J. D. 3677 were the first made with the double image photometer, and contained six sets.

5035. Fourth set on J. D. 6628 rejected. Settings in wrong quadrant.

5459. Observations on different nights discordant. Observations on J. D. 6628 and 6629, rejected for discordance. Residuals *98* and *129*, respectively.

5646. Second set on J. D. 6627 rejected. Settings in wrong quadrant.

15h 26m.7. Observation on J. D. 7058 rejected for discordance. Residual 82.

5846. Second set on J. D. 6659 rejected for discordance. Residual *96*. First set on J. D. 6660 rejected for discordance. Residual 95.

5948. Third set on J. D. 6747 rejected for discordance. Residual 141.

6426. First set on J. D. 6747 rejected for discordance. Residual *101*.

OBSERVATIONS WITH THE MERIDIAN PHOTOMETER DURING THE YEARS 1907 AND 1908.

THE principal results of the observations made with the 4-inch Meridian Photometer from 1879 to 1906, inclusive, are contained in H.A. 50 and 54. A more detailed account of those made in Arequipa during the years 1902 to 1906 will be found in No. I of the present volume. In the Revised Harvard Photometry, the magnitudes of the greater portion of the stars depend upon observations contained in two or more catalogues, and therefore made under different conditions. The systematic errors are thus greatly reduced. Many stars remain, however, which were observed in one catalogue only. They are indicated by the letter A in the column headed Photometric Residuals. After the completion of the observations described in No. I of this volume, it seemed best to observe these stars. This has accordingly been done, and the results for a portion of those south of declination −20°, and for a few miscellaneous stars, are given in Table II. The observer was, in all cases, Mr. Royal H. Frost.

The method of observation and reduction was unlike that adopted in the previous work. As one measure had already been obtained of each of the stars, the object was to secure a second measure on the same scale, thus reducing the accidental errors, rather than to make an independent determination of the absolute magnitude. It was not necessary, therefore, to measure stars at upper and lower culmination, and thus derive the constants of the series and the atmospheric absorption, but only to observe the stars whose magnitudes were desired. The apparent magnitudes of these stars were determined by correcting the magnitudes given in the Revised Harvard Photometry, by the atmospheric absorption. This was found by multiplying the length of path, already used in previous observations of these stars, by 0.25, the assumed coefficient of absorption. The correction was generally small, as a large portion of the stars culminated not far from the zenith. The mean of the differences between the apparent magnitude and the measured brightness was then applied to the latter quantity, and gave the apparent brightness of each star. The computed absorption was again applied, but this time with the opposite sign, and gave the required magnitude. Points were also plotted with times as abscissas and measured differences as ordinates, to correct for varying conditions during the progress of the series. The first method, however, appeared to be preferable, and was employed, as systematic errors in the former measures affecting successive stars were thus diminished. The star σ Octantis was generally measured at the beginning and end of each series. Changes in the instrument, such as a deposit of dew on one of the mirrors, would thus be detected.

A summary of the series of observations is contained in Table I. The successive columns give the Julian Day, after subtracting 2,410,000, the calendar date, the sidereal time of beginning, the sidereal time of ending, the number of observations of σ Octantis, and the total number of stars observed.

TABLE I.

SUMMARY OF SERIES.

J.D.	Date.	Beginning.		Ending.		σ	All.	J.D.	Date.	Beginning.		Ending.		σ	All.
		h.	m.	h.	m.					h	m.	h.	m.		
7698	1907 May 2	9	28	11	0	4	34	7965	1908 Jan. 24	7	2	8	14	4	40
7699	“ “ 3	9	24	11	2	4	68	7977	“ Feb. 5	7	9	7	59	4	40
7700	“ “ 4	9	21	10	43	4	68	8046	“ April 14	8	40	11	18	4	88
7831	“ Sept. 2	2	57	3	48	2	20	8108	“ June 15	13	48	15	48	4	34
7832	“ “ 13	2	26	4	24	6	74	8109	“ “ 16	13	12	17	18	4	86
7835	“ “ 16	2	41	4	12	6	74	8110	“ “ 17	13	16	16	11	4	62
7836	“ “ 17	2	43	4	54	8	106	8135	“ July 12	16	30	17	32	4	28
7853	“ Oct. 4	22	54	23	44	4	40	8136	“ “ 13	14	55	17	52	4	88
7854	“ “ 5	22	56	23	39	4	40	8137	“ “ 14	14	38	17	56	4	85
7856	“ “ 7	3	34	6	0	8	104	8174	“ Aug. 20	18	16	21	30	4	94
7864	“ “ 15	3	51	5	38	6	66	8179	“ “ 25	18	47	20	54	4	96
7865	“ “ 16	5	8	5	50	4	36	8180	“ “ 26	18	45	21	30	4	50
7867	“ “ 18	20	48	23	19	4	68	8187	“ Sept. 2	19	3	20	35	4	68
7893	“ Nov. 13	7	0	7	59	4	46	8193	“ “ 8	19	22	20	28	4	30
7898	“ “ 18	23	24	2	20	4	86	8195	“ “ 10	18	58	21	27	4	62

The results of the observations are given in Table II. Two sets of four settings each were generally made of each star, and, in many cases, a star was observed on only one night, since these observations were regarded as of secondary importance, and were made only when they would not interfere with the work of the photographic instruments.

The form of Table II is nearly the same as that of Table IV, on page 12 of this volume. The first column gives the number of the star in the Zone of the Cordoba Durchmusterung, for stars north of declination −52°, and in the Cape Photographic Durchmusterung, for stars south of this limit. The numbers of a few stars north of declination −23° are taken from the Bonn Durchmusterung. The number of the Zone is generally the same as the degree of declination given in the third column, but when they differ, owing to precession, the number in the first column is placed in Italics, and the nearest adjoining Zone is to be taken. The right ascension and declination are given in the second and third columns. The magnitude in the Durchmusterung is given in the fourth column, and the magnitude derived from the measures with the Meridian Photometer, in the fifth column. The three right hand figures of the Julian Days are given in the sixth column. Roman figures denote that the four left hand figures are 2,417, and Italics, that they are 2,418. The residuals from the mean photometric magnitude, given in the fifth column, are contained in the seventh column. A few discordant observations, indicated by the letter R, have been rejected. The values of these residuals are, for −51°641, *79* and *78*; for −50°848, *78*, *111*, and *105*; for −51°683, *84* and *60*; for −58°1673, 69 and 72; for −57°2418, *79*, and *87*; for −56°2770, 59 and 44; for −75°1697, *34*. For −29°2519, the first setting of the rejected observations was, in each case, in the wrong quadrant. −65°4148 is H.R. 8945. See H.A. 50, 224. The eighth column gives the residual found by subtracting the photometric magnitude given in the fifth column from that given in H.A., 50 or **54**.

The number of stars, of which the magnitude is given in Table II, is 377. The total number of photometric settings is 7,436. The average value of the residuals in the last column of Table II is ±0.13. This is the sum of the errors in the two catalogues compared.

Since September 10, 1908, no observations have been made, and the instrument has now been returned to Cambridge. The observations of the extreme southern stars, with this instrument, are thus completed, unless later it should be sent for the fourth time to the southern hemisphere.

TABLE II.

GENERAL CATALOGUE.

DM. No.	R.A. 1900.		Dec. 1900.		Magn.		J.D.	Residuals.	Res.
					DM.	Phot.			
	h.	m.	°	′					
4	0	1.7	−23	40	6.3	6.19	898	06,*06*	*13*
4		5.7	−73	47	6.9	6.74	853,853,	07,17,23,*24*,	02
							854,854,	01,*07*,09,*09*,	
							898	*13*,*02*	
57		8.7	−26	51	6.3	6.08	898	05,*04*	33
19		11.4	−76	28	7.4	6.78	898	05,*05*	*18*
8		13.5	−79	48	7.6	8.00	898	09,*09*	*02*
9		17.2	−77	59	7.0	6.06	898	04,*05*	*20*
138		22.3	−26	6	6.5	6.12	898	07,*06*	*17*
113		23.9	−51	5	6.5	6.27	898	03,*04*	12
116		25.6	−41	30	6.5	6.27	898	05,*06*	04
58		32.2	−65	41	7.8	6.53	898	*10*,10	*15*
42		34.8	−73	42	6.9	6.79	898	05,*04*	22
201		35.1	−45	21	6.4	5.98	898	11,*11*	04
207		40.2	−43	13	6.4	6.05	898	*17*,18	*05*
72		40.2	−63	3	6.6	6.09	898	06,*05*	08
166		40.3	−54	16	6.6	6.09	898	*01*,01	23
347		44.6	−23	55	6.5	6.31	898	06,*06*	*09*
338		48.3	−25	19	6.6	6.46	898	*16*,16	*02*
50		54.2	−61	14	6.1	6.34	898	18,*18*	03
80		58.9	−66	0	7.8	6.48	898	*10*,11	*26*
484	1	1.3	−24	32	6.3	6.30	898	04,*04*	*01*
496		2.3	−24	32	6.4	6.48	898	*13*,13	*22*
81		6.0	−58	13	6.6	6.52	898	*06*,06	*05*
440		25.3	−47	16	6.6	6.29	898	04,*04*	00
420		27.4	−46	5	6.3	6.16	898	08,*08*	12
411		28.5	−50	14	6.9	6.35	898	*12*,11	07
670		34.2	−25	32	6.6	6.66	898	08,*09*	*24*
358		35.0	−53	56	6.9	6.90	898	01,*01*	24
461		37.7	−50	32	6.7	6.56	898	03,*03*	16
595		41.4	−27	50	6.4	6.33	898	*09*,10	09
633		43.1	−42	15	6.4	6.17	898	*01*,00	*07*
487		46.3	−48	18	6.4	6.14	898	*07*,08	04
157		52.6	−61	22	6.1	6.04	898	04,*04*	18
123		55.2	−65	55	7.4	6.46	898	*19*,20	*03*
42		56.0	−78	51	6.4	6.09	898	*09*,09	13
125		57.1	−66	33	7.4	6.17	898	*18*,18	*03*
638	2	6.1	−44	17	6.5	6.33	898	03,*04*	16
532		6.3	−51	19	6.4	6.26	898	*07*,08	02
785		15.4	−42	18	6.6	6.33	898	10,*10*	01
724		18.3	−43	39	6.5	6.42	898,898,	*01*,12,*01*,*10*,	*12*
681		20.5	−41	18	6.3	6.29	898	*13*,14	*09*
641		39.1	−51	14	5.6	5.34	831,832,	*18*,*14*,09,*07*,	08
							832,832,	27,*08*,*01*,*06*,	
							835,835,	*12*,*21*,14,06,	
							835,836,	13,01,*14*,25,	
							836,836	05,08, R , R	
843	2	47.8	−50	43	9.3	8.90	831,832,	*09*,*28*,11,*03*,	. .
							832,835,	05,16,07,08,	
							835,836,	*23*,19,*12*,07,	
							836	00,09	
848		48.6	−50	17	7.2	7.16	831,831,	03, R ,*15*,*02*,	*05*
							831,832,	06,*35*,01,08,	
							832,832,	*05*,*02*,02,06,	
							835,835,	10,04,03,06,	
							835,836,	20,22,*16*,*13*,	
							836,836	07,*05*, R, R	
849		48.7	−50	38	7.8	7.93	831,832,	*48*,*07*,18,*02*,	. .
							832,835,	*01*,18,*05*,03,	
							835,836,	21,*06*,02,00,	
							836	*06*,09	
683		50.9	−51	17	6.3	6.19	831,831,	26,16,*11*,*12*,	*13*
							832,832,	03,05,*07*,*15*,	
							832,835,	*02*,17,*13*,*03*,	
							835,835,	06,01,*17*,*11*,	
							836,836,	*17*,16,30,*09*,	
							836	R , R	
866		51.9	−50	4	9.1	9.36	831,832,	*04*,*13*,02,26,	. .
							832,835,	00,04,*11*,01,	
							835,836,	10,04,*18*,10,	
							836	*08*,03	
316	4	16.6	−63	30	5.4	5.84	856,856,	*29*,06,15,*13*,	22
							856	07,16	
320		19.2	−63	24	8.2	7.90	856,856	20,*09*,00,*09*	*01*
324		20.8	−63	37	6.4	5.19	856,856,	06,02,02,06,	*01*
							856	01,*17*	
327		22.9	−63	32	8.8	9.16	856,856	08,*08*,*07*,05	15
330		25.1	−62	59	8.6	8.68	856,856	*04*,01,*06*,09	*01*
332		26.0	−63	2	6.7	6.82	856,856	*09*,00,03,06	08
357		26.6	−62	45	6.5	5.81	856,856,	*01*,*02*,20,*12*,	*03*
							856	00,*03*	
360		26.8	−61	58	8.5	8.08	856,856	10,08,*15*,*01*	20
1788		27.3	−37	6	6.8	7.44	832,832,	*08*,*05*,*02*,24,	*20*
							832,835,	19,05,24,03,	
							835,835,	*16*,*10*,03,07,	
							836,836,	01,*09*,*46*,*06*,	
							836	14,*06*	
48		29.1	−86	30	7.6	8.00	856,856,	00,15,18,*10*,	*07*
							864,864,	21,*07*,13,10,	
							865,865	*21*,*20*,*01*,16	
1671		35.4	−38	22	9.1	9.19	832,832,	00,08,09,03,	25
							835,835,	01,17,*41*,00,	

DM. No.	R.A. 1900.	Dec. 1900.	Magn.		J.D.	Residuals.	Res.	DM. No.	R.A. 1900.	Dec. 1900.	Magn.		J.D.	Residuals.	Res.
			DM.	Phot.							DM.	Phot.			
	h. m.	° ′							h. m.	° ′					
					836,836	03,13,*04*,*04*		2540	5 46.9	−29 9	8.3	8.20	856,856,	10,05,*01*,15,	10
1583	4 36.8	−39 0	7.1	7.53	832,832,	18,01,*07*,*10*,	*11*						864,864	*13*,11,*33*,04	
					835,835,	06,01,*24*,19,		77	6 6.2	−85 56	7.6	7.02	856,856,	24,05,34,12,	*28*
					836,836	*09*,*03*,18,*12*							856,864,	*03*,08,09,*17*,	
49	37.3	−86 25	8.2	8.78	856,856,	*05*,18,26,*24*,	. .						864,864,	16,07,08,*08*,	
					864,864,	08,02,12,03,							865,865,	01,*21*,*11*,*19*,	
					865,865	*13*,*25*,03,*06*							865	*16*,*35*	
1590	37.6	−39 46	7.5	7.94	832,832,	12,06,*08*,16,	04	2769	9.7	−29 22	6.8	6.37	856	13,*13*	03
					835,835,	02,09,02,09,		80	22.5	−86 23	8.7	8.78	856,856,	14,*02*,16,*20*,	. .
					836,836	07,*38*,*07*,*09*							864,864,	06,*01*,06,14,	
1454	37.8	−48 44	6.9	7.03	836,836,	*11*,*07*,05,09,	00						865,865	*07*,*05*,*22*,04	
					836	*02*,05		81	25.4	−86 16	8.9	9.04	856,856,	*13*,06,15,20,	. .
1867	38.5	−37 20	5.1	5.02	832,832,	06,*16*,*02*,04,	06						864,864,	04,*02*,*06*,34,	
					832,835,	07,15,*13*,*12*,							865,865	*11*,*18*,*10*,*20*	
					835,835,	*04*,05,16,*34*,		105	7 22.0	−86 52	6.8	6.53	856,856,	28,23,22,*12*,	*12*
					836,836,	*04*,18,04,07,							856,864,	16,*01*,22,04,	
					836	07,02							864,864,	00,13,*04*,*06*,	
1869	38.7	−37 48	6.8	6.77	832,832,	08,06,*19*,05,	11						865,865,	*20*,*12*,*23*,*15*,	
					832,835,	*06*,*03*,*10*,12,							865	*03*,*30*	
					835,835,	08,08,14,16,		3391	41.6	−46 46	7.0	6.88	893,893,	01,*09*,06,05,	*03*
					836,836,	*03*,*21*,00,*12*,							965,965,	*03*,*03*,01,*03*,	
					836	*16*,05							977,977	05,*16*,*13*,23	
1703	38.8	−38 44	8.4	8.65	832,832,	*11*,*06*,*21*,*02*,	11	3423	43.8	−46 49	8.2	7.94	893,893,	*18*,04,04,10,	. .
					835,835,	12,*12*,*09*,17,							965,965,	06,*07*,10,*03*,	
					836,836	06,26,*07*,10							977,977	*22*,*31*,28,18	
1601	39.3	−39 3	8.0	8.64	832,832,	11,07,05,06,	14	3310	44.2	−47 56	9.2	8.84	893,893,	28,17,*01*,02,	. .
					835,835,	*18*,*18*,*06*,*09*,							965,965,	29,01,20,32,	
					836,836	12 *19*,14,17							977,977	*36*,*18*,*30*,*41*	
1471	40.2	−50 40	5.5	5.19	836,836,	03,*16*,15,*11*,	07	3435	44.5	−46 22	5.9	5.34	893,893,	*06*,17,03,18,	*08*
					836	12,*04*							893,965,	*08*,*10*,*01*,*18*,	
1479	41.1	−48 31	7.4	6.88	836,836,	03,*05*,*17*,*09*,	*07*						965,977,	02,*05*,*10*,*14*,	
					836	12,19							977	24,01	
1476	41.1	−50 4	8.4	8.76	836,836	22,*04*,*18*,00	*33*	3437	44.5	−46 46	8.0	7.09	893,893,	03,*17*,20,*11*,	05
1494	43.4	−50 48	8.6	8.84	836,836	*03*,*01*,*06*,11	02						965,965,	04,*07*,03,06,	
1501	44.1	−50 34	9.0	8.87	836,836	05,14,*06*,*14*	*06*						977,977	*09*,*06*,17,*01*	
53	5 0.7	−86 31	8.2	9.32	856,856,	06,21,13,01,	. .	3438	44.6	−46 50	8.3	8.06	893,893,	*03*,*24*,*04*,31,	. .
					864,864,	*11*,21,*02*,09,							965,965,	10,*15*,*19*,*02*,	
					865,865	*07*,*25*,*13*,*16*							977,977	01,13,*03*,20	
2321	33.9	−28 45	5.3	5.08	856,856,	13,00,*07*,12,	24	*3446*	45.1	−47 2	8.7	8.55	893,893,	*08*,*04*,05,*09*,	. .
					864,864,	*05*,*15*,*09*,*16*,							965,965,	01,02,31,01,	
					864	17,12							977,977	*21*,*03*,*19*,29	
2449	43.2	−28 40	6.2	6.02	856,856,	16,*01*,*04*,15,	03	3458	46.2	−46 8	4.3	4.28	893,893,	*09*,17,*21*,*08*,	*03*
					864,864,	15,*26*,12,*17*,							893,965,	*12*,08,*10*,20,	
					864	*16*,09							965,977,	11,20,*38*,15,	
2511	45.3	−29 4	9.1	9.24	856,856,	03,00,*10*,*04*,	12						977	20,*10*	
					864,864	00,*02*,*02*,15		3460	46.3	−46 37	6.5	5.90	893,893,	22,*05*,*18*,09,	08
2516	·45.4	−29 37	8.3	8.43	856,856,	*24*,*06*,17,15,	18						893,965,	11,*04*,*20*,17,	
					864,864	05,*03*,*07*,04							965,977,	*06*,*08*,*12*,*08*,	
2519	45.6	−29 9	9.0	9.80	856,856,	R,12,19,*41*,	*03*						977	13,07	
					864,864	*05*,R,15,*01*		4300	8 30.2	−46 38	7.4	6.42	*046*	02,*03*	*10*

DM. No.	R.A. 1900.		Dec. 1900.		Magn.		J.D.	Residuals.	Res.
	h.	m.	°	′	DM.	Phot.			
4519	8	31.5	−39	37	7.1	6.57	*046*	*02*,02	*26*
3417		32.8	−50	37	6.4	5.70	*046*	*14*,14	26
713		33.4	−73	1	7.3	6.13	*046*	*05*,05	*11*
1075		37.1	−59	58	6.8	6.40	*046*	00,*01*	00
1584		37.4	−52	39	6.4	5.63	*046*	05,*05*	10
4020		37.9	−48	34	6.6	5.96	*046*	01,00	18
2281	9	14.6	−54	4	8.0	6.68	*046*	05,*06*	*42*
3693		15.4	−51	8	6.3	6.02	*046*	10,*09*	*15*
1002		16.1	−66	37	8.0	6.37	*046*	*09*,09	*49*
7162		16.5	−31	20	7.3	6.84	*046*	00,00	*06*
2186		16.5	−54	45	6.4	6.28	*046*	07,*06*	16
5023		18.1	−41	46	6.4	5.70	*046*	03,*02*	06
5446		18.7	−39	21	7.1	6.68	*046*	05,*06*	*18*
5099		18.7	−45	37	6.4	5.92	*046*	*08*,07	08
1265		21.5	−61	13	7.5	6.00	*046*	*07*,08	*03*
1271		22.9	−61	31	6.7	5.77	*046*	10,*10*	23
5895		23.5	−34	34	7.3	6.72	*046*	02,*01*	*24*
1037		24.5	−64	29	6.6	6.21	*046*	*07*,07	15
1673		48.1	−58	57	7.5	5.70	698,698,	12,06, R , R ,	08
							699,699,	01,*18*,*02*,03,	
							700,700	10,04,*13*,*06*	
2418		51.3	−57	57	7.1	6.72	698,698,	*46*,*16*, R , R ,	*07*
							699,699,	*20*,*02*,02,*14*,	
							700,700	20,29,33,16	
1714		53.5	−58	20	8.5	9.18	698,698,	*12*,*38*,*01*,10,	*14*
							699,699,	21,*06*,05,*04*,	
							700,700	16,*03*,00,16	
1738		54.8	−58	36	8.8	8.87	698,698,	06,*08*,24,*20*,	*20*
							699,699,	*04*,*12*,19,06,	
							700,700	*15*,00,08,*04*	
1750		55.5	−58	17	8.8	9.44	698,698,	20,*26*,*02*,08,	*14*
							699,699,	*08*,05,*12*,*15*,	
							700,700	14,14,06,*09*	
1801		57.1	−58	18	10.0	8.18	698,698,	28,04,*21*,20,	04
							699,699,	04,03,*22*,06,	
							700,700	*03*,*11*,09,*20*	
3087		58.0	−52	53	7.2	6.28	*046*	04,*05*	22
2770		58.5	−56	52	7.8	6.22	698,698,	07,*19*, R , R ,	*15*
							699,699,	09,*03*,*13*,22,	
							700,700,	*09*,*08*,*01*,*20*,	
							046	15,18	
1695		58.8	−59	56	6.8	5.96	698,698,	*14*,*26*,*24*,05,	15
							699,699,	05,11,23,02,	
							700,700	*03*,23,14,*11*	
5759		59.4	−46	9	6.5	6.10	*046*	08,*07*	17
1752		59.8	−59	41	7.0	6.18	*046*	*13*,13	*16*
1431		59.8	−61	40	8.5	6.67	*046*	*05*,05	*23*
1441	10	0.5	−61	24	6.8	6.18	*046*	*12*,12	16
4471		2.4	−51	42	7.2	6.74	*046*	01,*02*	02
5658		6.4	−41	13	6.7	6.00	*046*	*13*,14	12
1034	10	7.0	−68	11	6.0	5.90	*046*	07,*07*	16
1967		7.5	−58	39	7.7	7.42	699,699,	01,01,05,*14*,	*09*
							700,700	02,10,*07*,*01*	
1979		8.2	−58	20	8.2	6.07	699,699,	13,01,*07*,*04*,	09
							700,700,	*18*,*16*,*15*,*06*,	
							046	23,26	
2781		8.3	−57	34	6.7	5.86	699,699,	03,*10*,09,05,	26
							700,700,	*19*,08,03,07,	
							046	10,*12*	
1984		8.5	−58	39	8.1	7.71	699,699,	*08*,13,13,*09*,	*14*
							700,700	01,16,*31*,07	
4560		8.6	−51	40	6.7	6.31	*046*	14,*14*	11
1985		8.6	−58	27	8.6	8.48	699,699,	00,09,03,*03*,	*20*
							700,700	*09*,03,*13*,11	
1974		9.6	−59	25	6.4	6.15	699,699,	22,00,15,*09*,	25
							700,700,	*04*,*12*,*08*,*02*,	
							046	*07*,04	
2033		11.9	−58	14	9.1	9.18	699,699,	*14*,*07*,05,11,	. .
							700,700	02,*07*,09,01	
2008		12.7	−59	24	7.1	6.28	699,699,	*07*,03,*09*,16,	16
							700,700,	*13*,*05*,21,05,	
							046	*01*,*09*	
4990		12.8	−50	42	6.9	6.48	*046*	05,*05*	*08*
5765		14.3	−41	11	6.5	6.55	*046*	*04*,04	*29*
2720		44.2	−59	24	6.6	6.08	*046*	06,*05*	04
2755		45.5	−58	48	5.9	5.93	*046*	*08*,08	17
6220		50.5	−41	43	6.4	6.10	*046*	08,*09*	20
1960		50.6	−61	18	8.1	6.08	*046*	*12*,13	*03*
589		50.8	−79	2	8.1	6.49	*046*	09,*09*	*37*
2840		51.3	−59	59	7.5	6.02	*046*	*08*,09	01
755		54.4	−74	34	7.6	6.23	*046*	*04*,04	*18*
4912	13	14.2	−59	15	7.2	6.06	*109*	10,*10*	32
8580		15.1	−46	21	6.4	5.82	*109*	*06*,06	*02*
1467		15.4	−71	37	7.3	5.92	*109*	*04*,03	20
7465		16.2	−51	40	6.5	5.92	*110*	05,*04*	18
8260		16.9	−47	25	6.6	6.15	*110*	05,*05*	17
8261		17.1	−48	2	6.6	6.28	*110*	*07*,06	18
7884		17.9	−49	18	7.3	6.60	*110*	*03*,02	*16*
2743		18.6	−63	58	6.1	5.54	*110*	*04*,05	*08*
1059		19.3	−74	10	6.1	6.43	*110*	11,*11*	33
8194		41.2	−49	45	6.7	5.92	*109*	02,*01*	14
2014		44.0	−68	55	8.0	6.10	*109*	00,00	*36*
1945		45.1	−69	34	7.3	6.05	*108*	*14*,14	. .
11329		45.9	−23	54	6.7	6.55	*109*	*10*,10	*07*
2426		47.2	−67	10	8.1	5.94	*109*	02,*01*	*26*
8931		47.7	−46	39	6.6	5.77	*109*	*03*,03	17
5805		49.7	−53	38	6.9	6.74	*109*	*05*,04	*38*
5395		59.3	−59	14	7.1	6.34	*108*	*08*,08	16
9027	14	0.0	−42	36	6.7	6.28	*108*	14,*13*	*01*
3941		0.8	−62	44	7.6	6.60	*108*	*11*,10	*11*

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5383	14	1.8	−58	48	7.0	6.50	*108*	*08*,09	*07*
11551		6.7	−23	53	6.7	6.49	*110*	00,00	*04*
5933		6.9	−54	9	7.2	6.00	*110*	08,*08*	23
8589		8.5	−41	22	6.4	5.80	*110*	02,*01*	02
7087		8.6	−53	2	7.5	6.63	*110*	00,00	*33*
9181		9.3	−44	32	6.7	6.40	*110*	09,*10*	*03*
9235		13.9	−42	36	6.8	5.80	*108*	01,00	*09*
9082		16.1	−47	52	6.5	5.97	*109*	*02*,02	29
7195		17.0	−52	43	7.3	6.18	*109*	05,*05*	*24*
2718		17.7	−65	43	7.0	6.24	*109*	10,*10*	18
826		19.0	−76	17	7.5	5.86	*109*	14,*13*	09
8757		20.0	−41	52	6.9	6.47	*109*	*03*,03	*10*
9188		20.8	−45	41	6.3	5.96	*109*	17,*17*	*08*
5549		21.4	−58	45	6.8	6.37	*109*	07,*07*	13
2616		29.4	−67	29	7.6	6.04	*110*	01,00	05
9469		32.6	−46	9	6.7	6.08	*110*	05,*05*	12
9218		32.8	−48	37	6.9	6.41	*110*	*07*,07	06
6107		33.3	−56	1	7.3	6.54	*108,110*	04,*05*,07,*06*	*26*
5672		34.5	−58	12	7.2	6.31	*108,110*	08,06,*05*,*10*	01
6772		37.5	−58	3	7.3	6.29	*108,110*	04,07,04,*16*	*19*
9562		39.8	−47	1	6.3	5.87	*108*	*02*,02	02
894		40.0	−76	45	6.7	6.41	*137*	01,*01*	10
9326		41.0	−43	8	6.8	6.34	*136,137*	*04*,05,*01*,. .	00
6441		41.8	−56	14	7.0	6.37	*136,137*	05,08,*03*,*11*	*05*
3436		44.5	−63	23	6.8	6.10	*136,137*	00,07,03,*12*	*32*
931		48.4	−76	45	7.1	5.94	*136*	00,*01*	02
1281		49.1	−74	38	6.0	6.24	*136,137*	04,01,*13*,09	08
8939		50.0	−51	2	7.0	7.03	*136,137*	04,02,05,*11*	*54*
9494		51.3	−48	27	6.7	6.44	*137*	05,*06*	04
9871		52.9	−42	45	6.7	6.12	*137*	04,*05*	09
1729		57.2	−71	31	8.2	6.69	*109,137*	10,04,*12*,*02*	*19*
9243		58.2	−40	28	7.0	6.68	*109*	05,*06*	*26*
9630	15	0.4	−48	42	6.4	5.74	*109*	*06*,07	09
4030		0.6	−21	39	6.5	6.32	*109*	*06*,07	*21*
2725		0.6	−66	42	7.6	5.74	*109*	*07*,06	06
3518		1.1	−63	16	6.6	6.14	*109*	*09*,10	24
1714		2.2	−72	23	6.4	5.84	*109*	*05*,06	27
5656		2.7	−61	3	7.1	6.42	*109*	*04*,05	01
5698		8.5	−60	32	5.9	5.92	*108*	04,*03*	03
9824		8.9	−47	42	6.5	6.06	*108*	*02*,03	13
9749		9.5	−43	7	6.7	6.04	*108*	*05*,04	28
2836		11.5	−67	7	6.6	6.18	*108*	*01*,*00*	30
2864		16.8	−67	58	7.5	6.06	*108*	04,*03*	*10*
1134		26.0	−77	35	7.2	6.36	*110,136*	14,02,*07*,*11*	*32*
12155		27.3	−24	9	6.7	6.36	*110,136*	03,*04*,11,*09*	*07*
1222		29.6	−75	45	6.0	5.94	*110,136*	*03*,*13*,*03*,17	08
11000		31.5	−25	57	6.6	6.17	*109,110,136*	*01*,*24*,*14*,15,05,18	*14*
6206		31.7	−59	34	6.8	6.07	*109,110,136*	*12*,*15*,08,16,*12*,15	*01*
10478	15	32.2	−27	53	6.5	6.50	*109,110,136*	*23*,*03*,02,23,*06*,05	*17*
3993		32.9	−22	43	7.7	6.88	*136*	*10*,11	36
3996		33.5	−22	49	7.0	6.31	*109,137*	*08*,00,11,*04*	*10*
10210		33.9	−47	25	6.9	6.46	*109,137*	19,15,*27*,*08*	*20*
9909		35.4	−49	10	6.6	6.26	*137*	*05*,04	*20*
10245		37.7	−41	30	6.5	6.04	*137*	*02*,03	27
10550		40.1	−27	45	6.7	6.64	*137*	09,*10*	*19*
8912		41.4	−52	8	7.6	6.28	*137*	01,00	*24*
6911		52.1	−53	44	6.5	6.18	*110,137*	00,*15*,11,05	20
10113		53.2	−40	22	7.2	6.67	*137*	*07*,07	*39*
6922		53.3	−54	17	7.2	6.22	*110*	*03*,02	16
5122		54.1	−62	15	6.6	6.22	*110*	03,*03*	14
11817		56.4	−28	51	6.7	6.26	*136*	*13*,12	*10*
12499		57.9	−24	27	6.8	6.30	*136*	*04*,05	12
7079		59.4	−55	55	7.5	6.34	*136*	09,*08*	*06*
12552	16	1.9	−24	11	6.7	6.28	*109,136*	20,*22*,*06*,10	*06*
12731		2.8	−23	25	6.3	6.06	*109,136*	*15*,01,09,07	*27*
10251		4.5	−40	51	6.3	5.94	*109,136*	*03*,*14*,*01*,17	22
7413		5.5	−53	25	7.8	6.13	*109,136*	25,24,*21*,*27*	*15*
12623		7.7	−24	10	6.7	6.54	*136*	*16*,16	*20*
9469		9.6	−52	50	7.5	6.46	*136*	*04*,04	*02*
10724		15.5	−43	41	6.5	6.00	*136*	*03*,04	00
5325		16.3	−62	54	6.3	6.23	*136,137*	03,07,*09*,*02*	05
8035		21.4	−57	32	7.4	6.06	*135,136,137*	*04*,07,04,05,*06*,*09*	*07*
11379		25.2	−26	19	6.5	6.22	*109,135,136,137*	25,09,05,*13*,*07*,*03*,*07*,*09*	00
6594		30.0	−60	47	5.9	6.26	*109,135,136,137*	*02*,*29*,05,26,09,05,*13*,*03*	*02*
10797		30.7	−45	57	7.0	6.99	*137*	*01*,01	*41*
10959		31.4	−43	12	6.3	5.90	*109,135,136,137*	*14*,*09*,17,*10*,03,*02*,09,02	24
3196		33.2	−67	14	6.8	6.00	*109,135,136,137*	*16*,*15*,*01*,03,12,30,*14*,*01*	32
12765		35.5	−24	16	6.3	6.16	*109,137*	00,*06*,07,*03*	*08*
3202		35.7	−67	34	7.3	7.21	*135*	06,*06*	. .
10858		35.8	−45	53	6.6	6.35	*109,137*	19,05,*24*,*01*	*07*
10649		36.8	−40	56	6.5	6.16	*109,137*	*03*,07,*14*,10	13
8157		45.5	−57	45	7.5	5.92	*135*	*03*,02	03
4032		46.1	−63	6	6.2	6.20	*135*	15,*14*	*06*
11627		46.6	−42	53	6.6	5.97	*135*	*13*,13	*30*
10955		54.0	−50	58	7.0	6.54	*136,137*	*03*,01,05,*04*	03
11191		56.3	−47	1	6.6	6.16	*135,136,137*	07,*18*,*13*,07,13,01	12
11396		58.6	−43	58	6.6	6.17	*135,136*	*05*,05,*10*,09	21
11896	17	0.6	−26	22	6.6	6.43	*135,136,137*	04,02,*15*,12,06,*11*	*23*
5842		1.0	−61	32	6.6	6.37	*136,137*	*07*,*04*,01,10	15
2361		1.0	−70	35	7.4	6.30	*136,137*	03,*01*,*06*,06	*02*

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3296	17	3.1	−67	4	7.8	6.01	*137*	00,00	*07*
1610		3.6	−74	25	6.5	6.25	*137*	04,*04*	16
8478		14.3	−57	55	7.2	5.94	*136,137*	*18*,05,09,03	00
8191		14.7	−56	26	7.6	5.87	*136,137*	*08*,*04*,*06*,19	*12*
6800		15.2	−60	35	5.9	5.87	*136,137*	11,*03*,*16*,07	09
5590		18.6	−62	57	6.7	6.24	*136,137*	*13*,00,09,02	12
8304		22.9	−56	50	7.1	6.02	*136,137*	03,01,*08*,06	27
8682		27.2	−53	17	6.8	6.24	*136,137*	*19*,14,08,*05*	03
11747		33.8	−46	52	6.3	5.80	*136,137*	02,*03*,03,*01*	31
13184	18	21.5	−26	41	6.8	6.30	*174*	*02*,01	*07*
13192		21.9	−26	49	6.6	6.40	*174*	*07*,06	*12*
12564		21.9	−43	54	6.9	6.44	*174*	11,*11*	06
12319		22.4	−47	17	6.5	5.66	*174*	04,*04*	04
13206		22.8	−26	38	7.0	6.54	*174*	06,*06*	*08*
13170		23.2	−25	19	7.6	6.48	*174*	*06*,06	*25*
7418		24.7	−58	46	7.0	6.34	*174*	*02*,03	16
11158		26.5	−52	58	7.8	6.40	*174*	*12*,11	*10*
1180		27.4	−78	9	7.1	6.68	*174*	09,*09*	10
12644		31.7	−48	0	6.3	5.78	*174,174*	08,*11*,*10*,13	26
6229		36.1	−61	12	7.5	6.26	*174*	01,*02*	*10*
9180		36.9	−56	59	7.9	6.34	*174*	*06*,07	*04*
11273		45.3	−52	3	7.2	6.30	*180*	*04*,04	18
12769		45.5	−48	28	6.4	6.18	*180*	01,*01*	32
13562		46.3	−26	46	6.8	6.38	*180*	*07*,07	*06*
15449		46.3	−29	29	6.5	6.06	*180*	*05*,05	23
6002		47.6	−62	55	7.7	6.42	*179*	*05*,05	08
3404		50.0	−66	47	7.2	6.07	*179*	04,*04*	*01*
4928		52.4	−22	40	7.0	6.20	*179*	01,00	*16*
13839		55.1	−42	3	6.9	6.16	*179,187,195*	14,07,*23*,*05*,04,00	23
4946		55.6	−22	50	6.5	6.29	*179,187*	02,*05*,01,03	05
3185		59.3	−68	35	6.6	5.41	*179,180*	00,*03*,12,*08*	*11*
12901		59.4	−48	27	6.4	5.96	*179,195*	09,*16*,04,05	14
15692		59.5	−29	14	7.0	6.97	*195*	*08*,08	*05*
9001	19	0.6	−55	52	7.2	6.60	*179,187,195*	08,*10*,16,*18*,01,01	*10*
4977		1.0	−22	39	7.1	6.92	*195*	06,*05*	*09*
15403		1.2	−28	48	6.5	6.00	*179,187*	*01*,08,*06*,00	19
12377		5.0	−50	39	6.5	6.25	*179,195*	15,*03*,*07*,*04*	*08*
2962		5.7	−69	22	6.6	6.38	*195*	02,*03*	12
5292		6.5	−21	50	7.0	6.42	*179*	02,*01*	00
13936		7.0	−26	5	6.3	5.84	*179,195*	*04*,*07*,00,10	02
9513		10.2	−53	34	7.0	6.40	*179,195*	*11*,*01*,06,07	02
3218		13.6	−68	34	7.6	6.46	*174,174,179*	*30*,04,05,00,17,05	04
14133		15.2	−42	12	6.7	6.35	*174,179,*	06,00,*09*,11,	11
16041		15.7	−29	42	7.0	7.08	*174* *180*	17,*16* *05*,*05*	04
13352		17.2	−43	55	6.6	6.25	*174,179,180*	*11*,16,16,00,*11*,*11*	*17*
16104	19	18.8	−29	30	6.1	5.94	*179,180*	*05*,08,00,*04*	15
3251		20.8	−68	38	7.8	6.35	*180,195*	*13*,*22*,31,05	*40*
9096		21.7	−55	38	6.6	6.24	*174,180,195*	10,08,01,02,*12*,*08*	*06*
9100		22.4	−55	19	6.8	6.29	*174,193,195*	*09*,12,*17*,06,03,03	12
3442		28.8	−66	8	7.3	6.82	*174,193,*	12,*07*,02,*09*,	..
7627		30.0	−58	12	7.2	6.23	*174,193,195*	00,*16*,*02*,03,13,02	*05*
3445		30.0	−66	55	6.7	6.37	*174,193,195*	02,*20*,*02*,10,12,*02*	03
3447		31.9	−66	5	7.8	6.14	*195*	*03*,03	*14*
13354		32.5	−45	31	6.7	6.23	*174,187,193*	*04*,*07*,14,06,*12*,03	01
3680		40.1	−67	3	7.7	6.44	*174,187,193*	*10*,*23*,*07*,05,27,06	02
9678		41.2	−53	7	7.1	6.18	*174,187*,193	*12*,05,15,02,03,*10*	12
3827		41.4	−65	50	6.9	6.02	*174,187,193*	*14*,12,*04*,06,07,*07*	10
13103		42.9	−47	48	6.3	5.94	*174,179,187*	04,*03*,01,*06*,08,*07*	06
16546		43.0	−29	2	6.2	6.09	*174,179,187*	14,*01*,*17*,18,*10*,*02*	01
15668		48.3	−24	11	6.4	6.17	*174,179,187*	07,*04*,04,*16*,07,00	11
7683		48.7	−58	11	7.8	6.64	*174,179,187*	*06*,12,04,*17*,01,06	*24*
13735		53.4	−43	19	6.7	6.22	*174,179,187*	*02*,*10*,06,*08*,19,*06*	*15*
13807		54.6	−41	5	6.6	6.38	*174,179,187*	07,03,04,*02*,*10*,*04*	12
3703		55.5	−67	35	7.1	6.11	*174,179,187*	21,*02*,02,*06*,00,*17*	*09*
3473		58.8	−66	39	8.0	6.47	*174,179,180*	*03*,10,*06*,07,*02*,*08*	*19*
9317		59.7	−55	18	7.2	6.22	*174,179,180*	04,01,15,*03*,*02*,*12*	04
9622	20	3.0	−57	49	7.2	6.40	*174,179,180*	*05*,*07*,02,11,05,*06*	10
13855		5.5	−43	5	6.4	6.22	*179,180*	00,*10*,14,*04*	10
4571		5.6	−63	43	5.9	6.12	*174,179,187*	09,*12*,01,*02*,*12*,15	08
4576		10.2	−63	33	6.8	6.34	*174,179,187*	19,16,08,*18*,*08*,*15*	*02*
13915		11.4	−43	11	7.0	6.87	*174*	14,*14*	37
13509		11.8	−48	2	6.5	6.33	*174,179,187*	*23*,29,*06*,16,*20*,05	*05*
13340		12.1	−47	54	6.3	6.30	*174,179,187*	29,*03*,*08*,*04*,17,*19*	04

DM. No.	R.A. 1900.		Dec. 1900.		Magn.		J.D.	Residuals.	Res.
	h.	m.	°	′	DM.	Phot.			
9365	20	12.8	−55	22	7.9	6.32	*174,179,187*	11,29,*07,03,22,08*	*16*
12929		14.4	−50	18	5.5	6.36	*174,179,187,193*	12,01,30,*03,08,19,01,15*	04
14024		19.1	−41	7	6.3	6.10	*179,187,193*	*11*,01,00,06,*07*,14	01
5442		23.6	−22	43	6.2	6.21	*179,187,193*	04,02,*02,08,05*,10	01
17122		24.8	−29	27	6.5	6.40	*179,187,193*	*05*,02,09,06,03,*16*	*26*
14854		26.9	−25	17	6.4	6.33	*179,180,187*	*09,07*,08,11,*07*,04	*13*
4602		31.4	−63	15	7.6	6.29	*179,180,187*	07,03,*05,10*,08,*05*	07
14920		31.9	−25	28	6.6	6.34	*179,187,193*	*07*,15,*06,06,06*,10	*08*
16193		34.3	−24	9	6.5	6.42	*187*	*07*,08	*09*
16195		34.5	−24	28	7.2	7.22	*180*	01,*02*	*12*
14959		34.6	−27	0	6.7	6.52	*179,180,187*	13,*04,24*,02,10,03	*11*
15192		35.4	−26	21	6.6	6.33	*179,180,187*	*24,14*,19,20,02,*03*	02
15014		39.2	−27	37	6.7	6.64	*179,180,187*	11,*24*,13,*06*,13,*04*	*14*
16328		47.2	−24	9	6.6	6.30	*179,195*	*12,16*,20,06	*09*
12748		47.4	−51	6	6.3	6.12	*195*	00,00	34
16975		48.1	−28	18	6.7	6.52	867,*179,195*	09,20,*07,20,10*,06	*06*
3398		52.3	−68	36	6.0	6.34	867,*195*	17,08,*09,14*	13
17504		56.9	−29	30	6.9	6.84	*180*	*03*,03	*07*
17077		57.2	−28	7	6.6	6.36	867,*195*	*02,01*,09,*06*	*17*
1473		57.3	−76	36	7.2	6.71	867,*195*	18,24,*23*,19	*25*
2195	21	1.3	−72	57	6.9	6.20	867,*195*	00,*01*,02,*02*	02
1697		7.4	−75	46	7.0	6.51	867,*195*	20,*06,15*, R	33
17692		13.0	−29	11	6.5	6.49	867,*195*	*05,07*,11,01	*06*
15541		14.0	−26	46	6.7	6.72	867,*195*	15,*02,08,07*	*22*
13325		14.4	−50	22	6.4	6.48	867,*195*	*21*,00,16,04	*10*

DM. No.	R.A. 1900.		Dec. 1900.		Magn.		J.D.	Residuals.	Res.
	h.	m.	°	′	DM.	Phot.			
2598	21	15.7	−72	14	7.0	6.00	867,*195*	20,06,*19,05*	08
13796		17.7	−47	3	6.4	6.30	867,*195*	05,*05*,10,*12*	18
16889		18.4	−23	11	6.8	6.52	867	04,*04*	*04*
9872		22.0	−54	9	6.9	6.40	867	*09*,10	08
10092		26.3	−53	11	6.8	6.62	867	15,*14*	*20*
14602		27.9	−43	23	6.5	6.23	867	*04*,04	17
16729		29.5	−23	54	6.7	6.38	867	*07*,08	02
9700		33.5	−56	11	7.2	6.48	867	03,*02*	*06*
18414	22	33.2	−29	16	6.8	6.54	867	09,*09*	*17*
14307		36.7	−47	43	6.5	5.99	867	11,*11*	27
6676		37.8	−61	1	7.2	6.34	867	02,*01*	10
13955		40.1	−49	30	6.7	6.62	867	*07*,08	18
14331		40.8	−47	28	7.0	6.64	867	14,*15*	20
1554		41.4	−77	35	6.6	6.76	867	*01*,02	*08*
6369		41.8	−62	13	7.2	6.24	867	*05*,04	10
2726		42.1	−70	52	6.2	6.44	867	*04*,04	*06*
16324		42.5	−26	26	6.5	6.31	867	02,*02*	17
7610		45.5	−60	25	7.2	6.62	867	01,00	*22*
13988		47.7	−49	8	6.3	5.98	867	03,*02*	34
16419		55.0	−26	10	6.6	6.52	867	*09*,09	*08*
6354		57.4	−21	24	6.4	6.07	867	06,*06*	12
4148	23	29.5	−65	15	7.5	7.07	853,853,853,853,853,854,854,854,854,854	*01,03*,15,04,20,23,*07*,21,18,03,02,04,*08,26*,06,01,*13,11,19,29*	R
4913		33.1	−63	27	7.4	6.71	853,853,854,854	*27*,06,09,13,00,*09*,03,04	*04*
4159		38.7	−64	58	6.9	5.72	853,853,854,854	00,*15,03*,03,*09*,00,22,*01*	*06*
2346		59.5	−73	28	7.6	7.40	853,853,853,853,853,854,854,854,854,854	*09*,02,07,*13*,00,07,12,*14*,11,*12*,03,*14*,21,*11,02,06*,17,20,00,*12*	03
2800		59.6	−72	0	5.2	5.62	853,853,854,854	04,*06*,13,07,12,*01,22,10*	02

ANNALS OF HARVARD COLLEGE OBSERVATORY. VOL. LXIV. NO. VIII.

BASIS OF MERIDIAN PHOTOMETER MAGNITUDES.

THE observations obtained during the years 1879 to 1882, with the 2-inch Meridian Photometer, were made by comparison of each star with the Pole-star. The Harvard Photometry contained in H.A. 14 was formed from these measures. The danger of depending on the constancy of the light of a single star was fully recognized, and accordingly one hundred stars, in declination between +58° and +76°, were selected, and measured on a number of nights. The two images of the Pole-star were generally compared at the beginning, middle, and end of each series, and measures were also made of several of the standard stars, both at upper and lower culmination. A discussion of the results in H.A. 14, 35, showed that no sensible variation of long period occurred in the light of the Pole-star. Although the reduction of the separate observations was only carried to tenths of a magnitude, it appeared that the residuals of groups of fifty series had an average value of only ±0.02 magn. The small variation detected by Hertzsprung introduced an error in the final results that is almost imperceptible. Assuming the range to be 0.10 magn., the maximum error will be 0.05 and the average error, ±0.03. Since each star was observed on at least three nights, the effect on the mean would be about ±0.02. As the probable error of the final magnitudes is about ±0.08, a correction for the variation in the Pole-star would affect the error, and consequently the final magnitude, on the average, by less than a hundredth of a magnitude.

It has been shown in H.C. 174, that the actual variation of the Pole-star is confirmed by these observations. The apparent range is about a tenth of a magnitude. The observations are divided into ten groups, and a smooth curve can be drawn through the points representing them which indicates a probable error of each group but little greater than a hundredth of a magnitude.

The Pole-star was not used as a standard in any of the later measures, which were made with the 4-inch Meridian Photometer. In the observations at Cambridge all the stars were compared with λ Ursae Minoris; in Peru, the comparison star was σ Octantis. In all this work, the scale was determined mainly, or wholly, from the one hundred circumpolar standards. The effect of a slight variation of any one of these stars would, therefore, be insensible.

Each of the one hundred standard stars was measured on nearly two hundred nights at upper culmination and on about fifty nights at lower culmination, during the years 1879 to 1902. They therefore furnish a large amount of material for discussing variations of long period, in the stars. Nearly all of the observations were made between seven and eleven in the evening. Accordingly, each star was observed continuously for about two months, and not again for ten months. Thus, stars in 12^h of right ascension would be observed during April and May of each year, those in 4^h during December and January. It will evidently be better to combine the observations in successive months, as, for instance, in December, 1900, and January, 1901, rather than those in a calendar year, as January and December, 1900. The year was, therefore, regarded as beginning when the stars in 0^h were first observed, so that observations of stars in 0^h in October and November, 1900, are regarded as observed in 1901, and will be called part of the "opposition" of 1901. See also H.A. 23, 46. The results of all the measures are contained in Table I. The stars are classified according to their spectra, those from Oe to B 8 being called B; from B 9 to A 3, A; from A 5 to F 2, F; from F 5 to G 2, G; from G 5 to K 2, K; from K 5 to M, M. The year is given in the first column, and the successive lines give the number of observations for the stars designated by the numbers in the headings of the column. These last numbers are taken from the first column of Table III. Thus, Star No. 2, is H.R. 130. The second portion of the table gives the algebraic mean of the residuals in hundredths of a magnitude for each year. The two portions of the table relating to stars of Class M are placed side by side. It will be noticed that the residuals derived from the observations of stars of Class M, made in 1900 to 1902, are systematically large and negative. These stars are red, and were measured by a different observer. The first four lines relate to observations made with the 2-inch Photometer, the others to those made with the 4-inch Photometer. During the year 1882 many stars were observed with both instruments. This number, therefore, occurs twice in each portion of the first column.

TABLE I.

ANNUAL RESULTS.

Year.	Class B.									Class A.																				
	2	4	7	13	19	28	68	71	80	3	5	8	12	15	17	21	25	42	43	46	54	55	62	66	70	76	85	86	90	94
NUMBER OF OBSERVATIONS.																														
1879	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	9
1880	4	5	3	6	5	9	7	10	10	3	2	1	3	4	..	6	6	6	4	5	5	6	8	6	7	7	10	9	8	4
1881	9	10	6	7	9	5	5	2	3	10	8	10	10	8	11	4	7	6	7	8	5	6	6	6	5	7	3	3	3	4
1882	5	5	5	6	7	7	4	7	..	5	5	4	7	5	9	8	6	3	3	4	4	4	8	4	6	3	..	..	..	..
"	..	..	..	..	..	1	..	..	11	..	..	..	..	..	..	..	1	4	4	7	2	2	4	1	..	12	8	11	11	12
1883	10	10	12	9	6	12	3	4	8	12	14	13	12	9	7	5	8	7	4	7	5	5	2	5	3	7	1	2	10	9
1884	12	11	15	11	4	9	9	8	12	14	17	18	5	7	7	2	6	10	9	11	7	11	12	8	8	8	10	8	12	13
1885	13	15	17	12	11	21	9	14	16	17	8	15	13	12	12	15	19	12	10	10	10	7	13	9	16	15	17	17	13	17
1886	16	11	18	18	13	17	17	20	25	18	16	20	16	17	14	14	21	14	13	13	8	8	9	15	22	23	19	25	18	21
1887	11	9	15	11	13	7	12	10	16	13	15	15	12	11	10	5	12	18	17	13	14	13	11	12	11	9	16	17	16	19
1888	18	10	19	9	16	21	14	17	5	20	15	17	12	15	14	22	25	9	8	6	11	12	8	20	18	11	15	13	5	3
1891	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1892	5	6	8	8	5	9	6	7	23	8	8	7	10	2	2	4	11	20	10	14	9	9	7	3	3	9	11	10	13	9
1893	6	7	14	7	6	5	8	14	14	8	7	11	8	6	6	2	6	4	1	4	4	2	9	12	13	10	13	15	13	19
1894	17	19	22	22	16	14	7	12	11	22	18	22	18	14	13	10	19	8	7	6	6	6	7	10	11	11	11	12	13	17
1895	15	13	17	16	12	19	1	1	12	14	13	19	12	11	14	13	15	14	13	16	10	10	5	3	1	1	9	10	13	12
1896	11	10	14	11	14	17	13	14	18	11	12	11	10	14	12	11	15	11	13	13	17	14	9	10	15	13	19	22	16	14
1897	12	14	16	10	12	19	9	9	27	15	16	15	12	10	12	12	16	12	11	11	9	10	10	11	8	20	16	22	21	14
1898	11	10	19	9	11	16	10	16	6	12	14	19	9	10	11	9	18	10	10	13	10	8	11	11	13	16	9	8	6	6
1900	..	..	..	..	..	..	..	5	12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	8	34	8	10	8
1901	13	20	20	18	14	6	14	12	8	22	20	12	8	20	14	22	10	8	10	16	8	12	12	14	2	8	4	..	4	4
1902	2	10	4	8	4	10	2	4	..	4	2	6	4	8	8	6	10	4	4	10	..	2	4	..	2	2	..	..	..	..
MEAN RESIDUALS.																														
1879	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	29	*05*
1880	*13*	16	10	06	00	*23*	11	14	04	00	*06*	09	*07*	02	..	*02*	01	09	17	01	*18*	*17*	08	07	06	*10*	*01*	03	*06*	14
1881	00	07	17	*03*	02	*21*	*06*	*16*	01	*08*	*05*	02	*06*	*08*	*04*	*17*	*13*	*16*	*07*	*07*	06	07	*03*	*21*	*16*	00	05	*27*	15	*06*
1882	*06*	02	06	00	*02*	*02*	*01*	00	..	01	08	*26*	*10*	09	*10*	*01*	*06*	11	12	*15*	*04*	00	*07*	*06*	*12*	*11*	..	..	..	..
"	..	..	..	..	..	*02*	..	..	*05*	..	..	..	..	..	..	..	*11*	09	*16*	08	07	09	26	11	..	*01*	*05*	*08*	04	12
1883	02	04	*01*	*03*	*02*	*08*	*08*	*08*	*05*	*11*	*03*	05	06	*11*	02	01	*09*	00	*06*	01	*02*	*04*	*06*	*09*	01	*11*	34	12	03	*03*
1884	02	*05*	07	*13*	*07*	*09*	*03*	04	*07*	*13*	02	08	01	*08*	04	*05*	*03*	*03*	*09*	02	*14*	*01*	*03*	*11*	02	*17*	09	06	*06*	02
1885	08	*02*	04	*03*	*07*	*08*	*19*	*03*	*06*	*13*	00	*02*	*01*	*08*	*04*	*02*	*09*	*09*	*03*	*02*	*06*	00	*06*	01	*03*	*09*	*07*	*01*	*04*	*02*
1886	*09*	04	*07*	*13*	01	*11*	03	01	*04*	*13*	00	*01*	*03*	*12*	*02*	*04*	*09*	*03*	*03*	*03*	03	*04*	*10*	06	02	*04*	*04*	01	*03*	*04*
1887	09	*01*	*06*	*10*	*02*	*01*	*10*	*07*	*04*	*12*	*04*	02	02	00	03	*05*	05	02	*01*	03	03	06	*03*	*02*	07	*04*	02	08	*06*	*04*
1888	01	*03*	*07*	*02*	00	*06*	03	*04*	*13*	*13*	00	*06*	00	*03*	05	*04*	*01*	*05*	02	00	*03*	*02*	*06*	*10*	*01*	*04*	*09*	*02*	02	*03*
1891	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1892	*01*	07	*08*	*01*	10	18	02	*03*	*04*	10	02	*03*	00	09	*08*	06	15	06	05	08	*01*	08	05	18	*01*	05	*04*	*08*	*08*	06
1893	08	*08*	00	03	03	01	00	00	*02*	21	02	06	06	*07*	07	12	00	*04*	*14*	*01*	*18*	*10*	*10*	04	05	00	*03*	09	*08*	*03*
1894	*04*	*04*	*08*	*10*	05	04	*10*	*01*	05	07	05	00	00	06	*09*	*02*	*05*	*09*	*03*	*01*	01	*12*	*04*	*10*	03	*03*	*13*	*02*	*09*	00
1895	*04*	*15*	*06*	*04*	*02*	*01*	*14*	*05*	13	04	03	*01*	01	*06*	03	*08*	*04*	*01*	05	04	00	*04*	*12*	02	*10*	11	01	04	*09*	*05*
1896	*06*	*04*	*07*	11	01	03	*07*	*07*	*04*	11	01	*06*	*01*	*02*	04	*02*	09	*06*	*08*	00	03	*03*	04	05	*04*	01	*03*	*02*	06	*04*
1897	*06*	*03*	*15*	*05*	01	09	15	*08*	08	10	00	05	10	12	*02*	04	05	10	*03*	*11*	16	*03*	02	06	*03*	05	*08*	00	*01*	05
1898	03	05	02	03	*11*	14	00	02	*10*	08	*01*	01	03	07	01	04	03	*03*	07	*02*	02	02	07	*07*	*04*	01	*13*	*05*	*08*	*10*
1900	..	..	..	..	..	..	..	19	14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15	15	05	13	*03*	08
1901	10	03	05	19	06	19	19	09	25	13	03	03	06	11	01	16	08	08	18	17	21	14	07	17	23	21	22	..	04	11
1902	08	00	08	18	04	15	19	22	..	06	01	05	00	01	09	12	21	00	04	*07*	..	19	06	..	*13*	10	..	..	..	..

TABLE I (continued).

ANNUAL RESULTS.

Year.	Class F.																	Class G.									
	6	9	11	18	27	32	38	39	40	41	52	53	59	72	88	91	92	1	20	34	37	65	73	74	75	77	98
	Number of Observations.																										
1879	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	5	..	..	..	..	..	..	..	..	..	3
1880	2	4	4	7	7	6	5	6	3	8	5	6	6	11	11	7	7	3	5	8	5	11	12	11	12	7	7
1881	8	8	8	7	6	8	7	6	9	4	8	6	6	2	3	4	4	9	8	6	6	2	1	2	4	6	4
1882	5	4	5	6	7	3	3	3	3	3	3	4	5	6	..	..	..	5	8	4	3	6	4	4	2	2	..
"	..	..	..	..	1	1	5	5	6	6	3	4	1	3	10	11	6	..	..	3	5	2	5	7	12	13	8
1883	13	15	14	6	8	13	11	12	11	8	2	2	2	3	7	10	10	9	7	11	12	5	5	4	6	5	7
1884	15	14	10	9	8	7	2	4	3	5	7	5	9	11	13	11	10	12	4	7	6	10	12	13	11	7	19
1885	9	16	16	9	16	19	16	16	13	12	12	10	12	9	19	11	9	15	15	17	17	10	7	10	12	8	18
1886	15	16	12	17	15	19	14	17	16	14	10	12	7	21	23	22	16	12	14	15	19	14	19	17	21	26	21
1887	15	13	8	13	6	10	8	8	10	12	14	13	9	7	19	18	13	12	14	10	14	10	7	7	7	6	13
1888	11	19	12	21	22	21	7	8	7	9	16	16	15	13	10	3	3	13	15	17	10	14	8	7	6	14	4
1891	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
1892	6	10	9	2	9	12	8	11	10	13	13	9	10	5	16	10	5	6	5	13	7	4	5	6	12	6	12
1893	8	11	8	5	7	6	7	1	5	5	5	5	10	16	11	15	15	6	8	8	8	12	13	3	9	10	12
1894	14	19	12	19	11	13	7	6	6	7	9	10	14	12	10	17	13	12	11	10	7	10	10	9	9	11	17
1895	11	13	16	14	15	18	11	10	11	10	15	11	6	1	11	13	13	14	13	15	12	3	2	1	..	2	13
1896	11	8	10	13	15	9	11	10	10	9	14	14	17	12	17	17	16	11	15	14	12	10	14	12	15	16	16
1897	16	17	12	14	18	19	12	12	11	11	11	9	9	12	25	19	16	9	12	17	12	11	20	12	17	20	13
1898	15	13	10	10	13	14	11	10	10	10	8	7	11	13	8	5	5	11	10	17	12	11	13	13	16	12	..
1900	..	..	..	..	..	..	..	..	..	..	..	..	..	2	10	26	34	..	..	..	..	..	2	..	4	23	8
1901	20	8	16	28	22	8	4	4	4	6	2	4	12	12	8	4	4	13	8	10	6	12	6	..	4	24	6
1902	4	6	4	12	11	2	2	4	4	6	2	2	8	..	..	..	..	2	6	6	4	2	4	2	2	..	..
	Mean Residuals.																										
1879	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	*12*	04	..	..	..	..	..	..	..	..	..	*19*
1880	05	14	*05*	*06*	*06*	05	03	*22*	*20*	*01*	23	*10*	01	06	01	09	04	*29*	*04*	01	09	03	03	01	*04*	05	14
1881	*01*	*02*	*03*	01	*06*	*10*	*15*	06	*01*	30	00	*10*	*04*	04	01	12	04	*01*	*02*	*19*	*07*	*02*	*20*	*04*	*12*	01	*10*
1882	09	*18*	*07*	06	01	*18*	*06*	01	03	18	*09*	08	07	*01*	..	..	..	07	*03*	*04*	11	03	02	*22*	13	*01*	..
"	..	..	..	..	*28*	*10*	*03*	14	*16*	*11*	07	12	06	05	*06*	03	04	..	..	*08*	10	*16*	06	*20*	*08*	*09*	01
1883	*02*	*01*	*02*	*01*	01	02	*06*	01	*11*	00	*08*	07	01	08	09	13	01	*11*	03	04	*08*	00	*02*	*01*	10	*05*	06
1884	02	02	01	*02*	*04*	00	09	04	*06*	*04*	*14*	*02*	*01*	*08*	*01*	*03*	*03*	08	*08*	02	*08*	02	*06*	05	*04*	04	04
1885	01	*02*	03	00	*01*	09	*03*	*01*	06	*05*	*05*	*01*	*08*	05	*11*	*02*	*14*	02	*01*	*07*	*04*	*01*	04	03	*03*	*06*	07
1886	*02*	*03*	03	01	*03*	06	*02*	02	05	*03*	*07*	*08*	*03*	*06*	*05*	00	*05*	*13*	01	01	*06*	01	*05*	06	02	*03*	06
1887	*02*	*09*	06	03	04	04	01	10	08	*09*	*08*	*06*	06	05	*02*	*01*	*01*	*06*	03	*02*	01	06	*03*	03	07	02	01
1888	04	*06*	02	*03*	*02*	*01*	05	00	*05*	*04*	*04*	*03*	05	00	*08*	00	07	04	11	04	*03*	*02*	*01*	03	*03*	*13*	*02*
1891	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	08
1892	*07*	09	*01*	*01*	13	11	01	09	05	*01*	07	04	*18*	01	03	*06*	*08*	02	*14*	10	*02*	06	09	*02*	*02*	05	*05*
1893	*08*	*01*	03	07	*02*	*08*	*03*	*17*	01	*08*	*13*	02	*08*	*01*	*02*	00	*07*	*06*	13	*06*	01	*04*	02	*12*	00	*05*	00
1894	*03*	*03*	02	00	*01*	*04*	*03*	05	*02*	*01*	*02*	*02*	*12*	02	07	00	02	08	07	*03*	*05*	*12*	*01*	*04*	*09*	00	05
1895	02	*02*	01	05	08	*01*	*06*	*03*	04	*02*	*04*	*04*	00	*04*	10	00	*04*	03	01	02	02	01	01	05	..	04	01
1896	02	06	08	*06*	09	*02*	*01*	*02*	05	*02*	05	00	02	*06*	02	*06*	00	04	02	08	*01*	03	*03*	05	05	00	02
1897	*04*	01	*05*	*04*	03	04	06	*01*	06	*08*	08	10	01	05	03	*04*	*04*	02	*02*	01	03	04	12	13	00	08	01
1898	*03*	*06*	*04*	05	07	02	03	02	09	*10*	*01*	03	*07*	05	*01*	*04*	*04*	03	*01*	00	*04*	*10*	01	16	04	11	..
1900	..	..	..	..	..	..	..	..	..	..	..	..	..	*12*	11	*04*	09	..	..	..	..	..	08	..	02	00	*05*
1901	04	13	*04*	03	09	04	08	04	05	07	14	01	13	*03*	*03*	*03*	20	02	*06*	05	17	07	06	..	12	*02*	*10*
1902	*02*	01	08	*03*	02	*01*	05	*04*	*02*	07	08	03	12	..	..	..	..	29	*06*	05	02	07	*08*	*04*	*03*	..	..

TABLE I (continued).

ANNUAL RESULTS.

Year.	Class K.																											
	10	22	24	29	30	31	33	35	44	45	49	50	56	63	64	67	78	79	80	81	82	84	87	93	95	96	97	100
Number of Observations.																												
1879	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	6	8	7	4
1880	4	3	5	5	5	7	6	7	5	8	5	4	5	9	9	7	6	10	10	7	5	6	10	8	5	4	4	5
1881	8	7	6	7	7	7	7	7	9	3	7	6	5	5	4	6	7	9	9	13	13	10	3	3	4	4	4	4
1882	5	5	6	5	5	4	3	3	3	3	3	4	4	4	6	5	2	..	..	..	..	..	..	..	..	..	..	..
"	..	..	..	2	2	1	3	2	3	4	8	5	2	4	4	..	12	11	10	10	6	7	11	10	10	10	8	10
1883	14	6	4	12	15	16	11	8	5	7	5	3	4	1	3	3	3	6	5	8	5	3	2	10	7	8	7	8
1884	12	4	7	8	7	9	9	10	9	10	10	7	10	11	13	10	5	7	5	7	8	5	10	14	15	15	16	16
1885	17	11	18	24	19	24	17	18	14	13	12	11	10	13	10	11	5	15	17	19	21	14	11	14	11	18	18	14
1886	18	8	17	16	18	18	15	11	15	13	11	11	10	9	6	15	18	24	31	29	28	16	18	21	19	23	18	16
1887	14	3	8	12	15	10	7	13	14	13	15	14	12	9	7	12	2	10	7	11	14	14	15	18	16	20	14	14
1888	17	16	19	24	31	25	19	14	8	6	10	6	9	9	11	15	18	23	17	12	12	13	11	3	3	3	3	3
1891	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	2	2
1892	8	1	3	9	9	9	9	15	18	16	4	6	9	7	4	7	4	11	14	13	11	11	10	14	5	14	10	5
1893	11	4	6	7	8	8	4	6	4	6	8	5	3	9	3	4	7	15	18	18	11	12	17	15	18	15	9	17
1894	20	9	10	10	9	12	12	10	8	7	8	7	7	6	4	6	11	14	16	14	12	10	14	17	16	14	17	15
1895	18	15	12	19	20	19	16	13	18	16	15	15	11	4	1	..	2	6	7	9	9	10	9	13	13	14	14	13
1896	9	10	12	13	12	11	12	12	23	14	12	12	13	10	10	9	17	19	16	16	20	17	18	16	13	13	14	14
1897	17	11	12	20	19	20	17	17	21	10	10	10	10	9	10	10	18	22	27	24	24	18	21	16	14	11	13	14
1898	13	8	13	18	15	13	16	15	13	13	13	11	7	10	9	12	16	19	18	20	17	11	10	5	6	5	6	..
1900	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	16	16	15	14	8	8	12	15	10	10	10
1901	18	4	16	4	8	8	8	8	6	6	10	14	14	12	8	20	16	16	12	12	12	8	4	2	2	4	2	4
1902	6	4	2	14	6	2	..	8	2	2	4	4	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..
Mean Residuals.																												
1879	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	*15*	*22*	*19*	02	*19*
1880	*07*	01	08	*02*	*16*	02	13	*06*	15	01	*15*	*22*	05	*08*	11	*02*	11	*01*	02	*03*	09	06	13	03	05	05	08	*01*
1881	06	00	*07*	05	08	01	01	12	06	11	03	06	13	*26*	*04*	*21*	01	*07*	*20*	*06*	*13*	*12*	*13*	06	*05*	*09*	*19*	*01*
1882	*01*	*01*	10	*04*	*02*	05	*10*	23	*08*	01	*08*	*16*	10	*10*	10	*06*	*09*	..	..	..	..	..	..	..	..	..	..	..
"	..	..	..	12	*19*	*02*	06	*06*	*16*	05	*06*	*06*	*09*	*09*	*01*	..	*14*	*07*	13	*04*	*06*	*10*	16	02	*06*	02	10	*05*
1883	07	*01*	12	*04*	*06*	*06*	03	03	*10*	04	03	*07*	*01*	19	06	18	05	00	00	*05*	*04*	*06*	*14*	*04*	07	*05*	04	04
1884	02	07	03	*04*	05	04	*01*	01	01	10	03	09	07	06	04	*05*	04	*15*	00	07	00	*09*	08	04	06	*06*	*08*	06
1885	05	*03*	*02*	04	01	01	*08*	03	00	*07*	01	*01*	08	02	04	03	08	01	05	04	*03*	01	00	06	10	01	08	05
1886	03	08	03	*04*	*01*	03	*03*	*05*	06	*04*	08	01	02	*09*	06	00	02	*03*	*02*	02	*04*	*01*	03	07	10	01	*04*	02
1887	06	*05*	*03*	*05*	*01*	01	03	01	05	*02*	02	04	*01*	00	05	06	*07*	*06*	*01*	*04*	00	03	08	04	02	03	06	03
1888	03	05	00	01	00	*04*	*03*	03	00	00	00	*03*	*06*	03	*01*	*05*	01	*01*	*01*	*06*	02	06	*05*	04	05	04	01	*03*
1891	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	00	*09*	*07*	12
1892	00	*06*	*17*	02	04	*01*	02	*03*	*01*	*03*	08	11	04	*03*	03	02	*02*	02	11	00	06	05	02	*01*	12	10	02	*14*
1893	01	09	12	*07*	*06*	02	01	*08*	*01*	*04*	06	*02*	*21*	06	*06*	11	01	09	04	03	09	12	08	04	03	08	*04*	07
1894	03	11	*03*	01	14	04	01	00	06	03	01	09	00	13	*07*	19	05	13	*03*	05	*04*	02	03	04	05	06	*01*	06
1895	01	05	04	02	03	00	02	03	03	*01*	*01*	02	01	08	*20*	..	07	11	*04*	*01*	06	*01*	*03*	00	06	12	01	04
1896	*03*	04	*05*	02	05	*01*	03	*03*	06	*04*	09	02	*07*	05	*01*	*01*	04	05	03	08	07	06	01	*05*	03	04	02	06
1897	08	02	00	03	05	*05*	04	*01*	07	00	05	12	*01*	06	00	04	02	00	02	01	*03*	*02*	06	00	*03*	*06*	*03*	04
1898	*04*	02	01	01	08	03	*02*	*02*	01	03	01	00	06	05	*01*	*04*	02	02	08	02	*04*	*06*	01	*06*	*05*	08	11	..
1900	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	*12*	03	*09*	*01*	*01*	02	*12*	*17*	*15*	*07*	*10*	*07*
1901	*10*	*23*	*15*	*06*	*02*	*13*	*04*	*13*	*21*	*02*	*08*	01	*15*	*09*	*06*	*17*	*09*	01	*03*	03	04	*03*	*23*	01	*24*	*07*	06	*13*
1902	*12*	*22*	*06*	*05*	03	02	..	*01*	03	*13*	*09*	*06*	..	..	..	*03*	..	..	..	..	..	..	..	..	..	..	..	..

TABLE I (continued).

ANNUAL RESULTS.

Year.	Class M.															Class M.														
	14	16	23	26	36	47	48	51	57	58	60	61	69	83	99	14	16	23	26	36	47	48	51	57	58	60	61	69	83	99
NUMBER OF OBSERVATIONS.																														
1879	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	24
1880	1	6	8	8	11	10	7	8	4	4	9	9	10	7	6	*14*	*19*	11	07	12	12	*04*	*02*	*08*	*01*	*09*	*05*	11	16	01
1881	8	6	3	7	3	2	5	4	6	7	3	5	2	11	4	*03*	*02*	05	07	*16*	*11*	05	15	*01*	*09*	*14*	*01*	*06*	*12*	04
1882	6	4	7	6	3	3	3	4	4	4	4	4	5	..	..	*04*	*15*	01	15	14	11	12	18	*13*	09	*11*	04	00	..	..
"	..	..	..	1	4	6	6	4	1	2	1	3	..	7	10	..	..	..	*03*	15	*03*	*07*	*01*	*09*	*10*	28	00	..	*04*	06
1883	9	9	6	8	8	6	6	5	4	6	2	2	5	5	6	08	10	02	03	06	06	*04*	*05*	03	*02*	*07*	05	08	07	*01*
1884	6	6	4	4	8	7	9	8	7	10	10	7	8	3	19	18	*13*	09	05	06	*05*	05	*03*	08	*01*	01	09	02	*05*	07
1885	13	6	11	18	16	10	9	12	9	11	14	11	10	16	7	05	*01*	01	01	05	11	03	07	*01*	01	03	01	00	19	08
1886	17	12	12	15	19	11	12	8	7	8	6	7	11	23	17	10	20	*03*	06	00	*04*	02	*02*	05	02	03	04	*01*	00	08
1887	11	7	6	12	15	16	12	10	8	8	12	10	9	15	12	09	10	01	03	07	00	02	05	00	*02*	*04*	*02*	09	02	04
1888	8	11	18	18	11	6	6	9	10	12	14	8	12	12	3	*05*	07	*01*	*06*	08	*08*	*06*	*05*	05	*09*	*03*	09	*01*	02	15
1891	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	*16*
1892	4	1	..	12	16	11	12	8	8	9	9	3	5	10	9	*07*	18	..	*13*	*04*	*08*	*07*	*04*	10	01	*09*	*08*	10	03	*13*
1893	5	5	2	6	9	6	5	6	3	3	7	3	6	18	10	10	09	15	*01*	*08*	02	03	*04*	12	02	26	*06*	03	03	*04*
1894	21	13	11	15	6	8	8	7	6	8	14	11	9	9	15	10	07	09	01	06	10	08	*03*	06	19	09	07	11	08	05
1895	19	7	14	14	10	17	14	17	11	8	6	6	1	10	14	14	23	05	10	04	00	*02*	05	01	02	*01*	*18*	*30*	01	*03*
1896	13	13	10	13	12	13	11	11	15	13	12	7	11	16	14	*08*	*01*	02	*03*	*06*	05	06	*05*	05	05	05	08	01	04	*01*
1897	15	9	11	16	15	10	9	10	9	10	9	10	11	23	13	*02*	*15*	*01*	*05*	*02*	*06*	*04*	*02*	*04*	03	01	*13*	11	*04*	*07*
1898	11	9	12	19	12	13	12	8	7	10	9	11	13	16	..	*03*	*03*	*01*	*06*	*01*	*03*	03	*04*	01	14	13	10	06	*03*	..
1900	..	..	..	..	..	..	..	..	..	..	..	..	2	12	12	..	..	..	..	..	..	..	..	..	..	..	..	*11*	*12*	*26*
1901	16	17	4	..	2	8	18	8	8	10	12	8	4	6	6	*20*	*31*	*31*	..	*31*	*21*	*13*	*11*	*07*	*16*	*08*	*11*	*16*	*20*	*20*
1902	4	..	4	8	6	4	2	..	4	6	5	2	2	..	..	*15*	..	*26*	*26*	*16*	10	*11*	..	*07*	*04*	*15*	*02*	*06*	..	..

Besides the circumpolar standards; about five hundred other stars were observed at lower culmination. The list was prepared by taking all the stars in the Harvard Photometry in declination between +50° and +70°. The results for all are given in Table II. The first seven columns contain the number in the Revised Harvard Photometry, the number in the Harvard Photometry, the right ascension for 1900, the declination for 1900, the length of the path, the spectrum, and the magnitude. They are all taken from the Revised Harvard Photometry except the path, which is taken from H.A. 23, 96. The next eight columns give the number of observations and the residuals taken from the tables in H.A. 14, 47, H.A. 23, 79 or 84, and H.A. 44, 177. In each case, the residuals are found by subtracting the H.R. magnitude from that given in the tables. The last two columns give the total number of observations and the mean of the residuals in the preceding columns. This mean is preferred to the weighted mean to reduce the systematic errors, which are probably larger than the accidental errors. The one hundred circumpolar standards are readily distinguished in Table II since they are the only stars having residuals in H.A. 14.

TABLE II.

STARS OBSERVED AT LOWER CULMINATION.

H. R.	H. P.	R.A. 1900.	Dec. 1900.	Path.	Spect.	Magn.	14		23		44		45		All.	
							No.	Res.	No.	Res.	No.	Res.	No.	Res.	No.	Res.
		h. m.	° ′													
7	1	0 1.2	+63 37	2.5	B8	5.49	..	..	3	03	4	01	3	*10*	10	*02*
21	9	3.8	+58 36	3.9	F5	2.42	12	*09*	11	11	9	10	8	07	40	05
60	38	11.6	+60 59	3.1	F8	5.80	..	..	3	*01*	4	06	4	*04*	11	00
91	55	18.9	+51 28	10.5	B3	5.36	..	..	3	04	3	05	..	..	6	04
93	56	19.3	+61 17	3.0	B9	5.39	..	..	3	00	2	*05*	4	*01*	9	*02*
96	57	19.7	+52 30	8.7	A	5.72	..	..	3	08	3	24	..	..	6	16
113	64	24.8	+59 25	3.6	F	5.92	..	..	3	04	..	..	3	06	6	05
123	69	26.2	+53 59	6.9	B5	4.88	..	..	3	*05*	..	..	..	..	3	*05*
130	71	27.3	+62 23	2.8	B	4.24	15	16	10	07	4	03	9	02	38	07
144	77	30.5	+53 38	7.3	B5	5.14	..	..	3	*14*	1	*40*	5	*17*	9	*24*
146	78	30.8	+59 47	3.5	A	5.76	..	..	3	*17*	..	..	4	21	7	02
153	82	31.4	+53 21	7.6	B2	3.72	..	..	3	02	3	*17*	3	*16*	9	*10*
168	94	34.8	+55 59	5.2	K	2.47	..	..	3	*22*	3	*19*	3	*13*	9	*18*
177	98	36.1	+65 36	2.2	K	5.92	..	..	3	*04*	1	*10*	2	*08*	6	*07*
192	104	39.0	+74 26	1.2	A2	5.59	14	17	15	12	2	11	7	15	38	14
196	110	39.6	+54 40	6.3	A	5.47	..	..	2	*11*	..	..	..	..	2	*11*
219	120	43.0	+57 17	4.5	F8	3.64	..	..	3	00	1	*46*	4	*18*	8	*21*
223	121	43.2	+50 25	12.6	B 9	5.03	..	..	2	*03*	..	..	..	..	2	*03*
233	130	44.7	+63 42	2.5	F	5.45	..	..	3	*05*	..	..	4	00	7	*02*
244	136	47.1	+60 34	3.2	F8	4.93	..	..	3	*04*	..	..	3	*06*	6	*05*
253	139	49.0	+58 26	4.0	K5	4.95	..	..	3	11	..	..	3	05	6	08
264	142	50.7	+60 11	3.4	Bp	2.25	16	*03*	12	15	1	03	3	01	32	04
265	143	50.7	+58 38	3.9	K	4.83	..	..	3	06	1	*32*	3	*05*	7	*10*
266	145	50.8	+59 50	3.5	B8	5.54	..	..	3	*04*	1	*10*	..	..	4	*07*
273	151	52.2	+65 49	2.2	A	6.00	..	..	3	02	1	*05*	..	..	4	*02*
297	163	58.1	+61 4	3.1	F	5.88	..	..	3	01	..	..	..	..	3	01
321	175	1 1.6	+54 26	6.4	G5	5.26	..	..	4	*05*	..	..	1	*09*	5	*07*
326	177	2.4	+57 44	4.3	A	5.70	..	..	5	*04*	2	16	1	*01*	8	04
336	184	3.9	+68 15	1.8	A	5.34	15	36	12	*05*	4	00	9	01	40	08
342	188	5.0	+63 40	2.5	B9	5.46	..	..	3	*11*	3	06	3	03	9	*01*
343	189	5.0	+54 37	6.3	A5	4.52	..	..	5	*09*	4	*31*	2	02	11	*13*
345	191	5.1	+64 29	2.4	B8	5.49	..	..	4	04	3	*21*	1	*13*	8	*10*
382	208	13.8	+57 42	4.3	G	5.25	..	..	4	*02*	1	16	1	*35*	6	*07*
399	218	18.9	+67 36	1.9	K	4.96	..	..	3	*12*	4	*09*	3	*26*	10	*16*
403	219	19.3	+59 43	3.5	A 5	2.80	16	06	17	02	5	11	7	14	45	08

H. R.	H. P.	R.A. 1900.	Dec. 1900.	Path.	Spect.	Magn.	14		23		44		45		All.	
							No.	Res.	No.	Res.	No.	Res.	No.	Res.	No.	Res.
		h. m.	° ′													
427	232	1 23.8	+69 45	1.7	F	5.95	..	..	3	*06*	..	..	2	*11*	5	*08*
428	233	23.9	+65 35	2.2	A	6.16	..	..	3	*28*	1	*09*	..	..	4	*18*
442	241	27.4	+58 44	3.9	G 2	4.88	..	..	3	05	2	*18*	1	*25*	6	*13*
461	250	31.6	+57 28	4.4	K5	5.74	..	..	4	05	1	00	2	*11*	7	*02*
478	257	34.9	+67 32	1.9	Ap	5.54	..	..	3	*03*	1	00	2	16	6	04
480	260	35.2	+70 7	1.6	A	5.26	..	..	3	*19*	1	18	3	*06*	7	*02*
491	266	36.6	+60 3	3.4	A	5.75	..	..	3	*22*	3	*02*	4	16	10	*03*
496	269	37.4	+50 11	13.2	Bp	4.19	..	..	3	05	2	*46*	..	..	5	*20*
533	283	45.4	+54 39	6.3	B3	5.49	..	..	4	*03*	2	*35*	1	*01*	7	*13*
536	284	45.8	+50 18	12.9	A	5.64	..	..	2	*20*	1	13	..	..	3	*04*
542	287	47.2	+63 11	2.6	B5	3.44	16	01	17	02	8	*04*	6	11	47	02
548	290	48.2	+68 12	1.8	B8	5.03	..	..	2	05	4	*05*	1	*20*	7	*07*
567	300	52.2	+64 8	2.5	A	5.18	..	..	3	04	4	00	2	00	9	01
575	304	53.8	+70 25	1.6	A2	4.61	16	08	20	04	8	*15*	7	*02*	51	*01*
586	311	55.4	+64 25	2.4	A 2	5.92	..	..	3	*18*	4	*14*	5	*04*	12	*12*
589	312	55.6	+63 54	2.5	B5	5.62	..	..	3	*10*	3	*02*	3	*03*	9	*05*
590	314	55.6	+54 1	6.9	B8	4.99	..	..	3	*06*	4	08	2	*01*	9	00
645	348	2 7.0	+50 36	12.2	G 5	5.40	..	..	3	*02*	1	15	..	..	4	06
661	359	10.9	+57 26	4.4	K	6.09	..	..	4	*13*	1	*23*	2	*29*	7	*22*
685	373	15.3	+55 23	5.6	A 2	5.22	..	..	3	01	..	..	3	02	6	02
707	384	20.8	+66 57	2.0	A5	4.59	14	11	16	21	3	*10*	8	01	41	06
743	401	28.5	+72 23	1.4	K	5.34	17	07	19	07	6	*08*	11	*04*	53	00
785	424	35.8	+54 41	6.2	A	5.66	..	..	3	*10*	3	05	6	07	12	01
791	423	36.2	+67 24	1.9	A	5.84	..	..	3	02	4	04	11	06	18	04
834	443	43.4	+55 29	5.6	K	3.93	..	..	3	00	4	18	11	*05*	18	04
854	454	47.2	+52 21	8.9	Gp	4.06	..	..	4	*09*	3	13	3	93	10	32
860	456	48.0	+61 7	3.1	F	5.63	10	08	8	19	7	*02*	8	*06*	33	05
890	470	53.7	+51 57	9.6	B5	5.15	..	..	4	*05*	1	15	..	..	5	05
915	483	57.6	+53 7	7.9	Gp	3.08	..	..	3	03	5	12	1	*18*	9	*01*
918	484	58.0	+56 19	5.0	K	5.08	..	..	3	*05*	6	*15*	2	*18*	11	*13*
922	488	58.9	+63 41	2.5	A	5.82	16	04	16	22	6	01	4	*11*	42	04
964	511	3 8.2	+56 45	4.8	F	5.92	..	..	4	*06*	3	*07*	1	11	8	*01*
969	513	9.0	+50 35	12.3	Kp	5.29	..	..	4	*05*	..	..	..	..	4	*05*
985	516	11.2	+65 17	2.3	B2 p	4.76	19	07	14	15	7	*06*	3	*16*	43	00
1009	534	16.0	+64 14	2.4	K5 p	5.55	..	..	3	10	5	01	2	03	10	05
1035	551	21.0	+59 36	3.5	B9	4.42	..	..	3	*26*	6	00	1	05	10	*07*
1040	553	21.9	+58 32	3.9	B9	4.76	..	..	3	03	4	16	..	..	7	10
1046	557	22.4	+55 7	5.9	A2	4.98	..	..	3	*02*	3	12	..	..	6	05
1073	569	26.0	+54 38	6.3	A	5.82	..	..	3	13	2	14	1	34	6	20
1105	583	33.5	+62 54	2.7	Mb	5.32	20	12	12	01	6	*13*	4	14	42	04
1112	587	34.5	+59 39	3.5	K	5.98	..	..	3	*05*	2	*16*	1	*48*	6	*23*
1124	592	36.5	+66 53	2.0	F	5.84	..	..	3	*02*	2	*28*	5	*02*	10	*11*
1129	596	37.3	+63 2	2.7	F	4.96	..	..	3	02	3	*10*	5	*04*	11	*04*
1148	607	39.8	+71 1	1.5	A	4.67	18	03	14	12	5	*20*	6	*03*	43	*02*
1155	612	40.4	+65 13	2.3	Ma	4.71	18	*07*	8	01	3	*02*	3	*09*	32	*04*

H. R.	H. P.	R.A. 1900.	Dec. 1900.	Path.	Spect.	Magn.	14		23		44		45		All.	
							No.	Res.	No.	Res.	No.	Res.	No.	Res.	No.	Res.
		h. m.	° ′													
1160	617	3 41.0	+50 26	12.6	A	5.92	..	..	2	*20*	..	..	1	*09*	3	*14*
1192	631	45.6	+57 40	4.3	A	5.79	..	..	3	00	2	*16*	2	*03*	7	*06*
1204	639	48.6	+62 47	2.7	B9	4.87	..	..	3	*12*	3	*01*	5	01	11	*04*
1205	641	48.6	+60 49	3.2	K	5.22	..	..	3	*13*	2	*04*	3	09	8	*03*
1210	643	49.2	+50 24	12.7	F	5.47	..	..	1	*01*	..	..	1	*28*	2	*14*
1242	659	56.1	+58 53	3.8	F	5.07	..	..	2	*13*	2	*05*	3	11	7	*02*
1261	671	59.1	+50 5	13.5	A	4.33	..	..	..	..	..	..	2	24	2	24
1305	705	4 8.1	+61 36	3.0	A	5.64	19	00	10	22	..	..	8	*01*	37	07
1313	709	8.8	+57 37	4.3	K	5.80	..	..	3	06	1	42	5	03	9	17
1314	711	8.9	+53 22	7.6	A2	5.12	..	..	3	08	1	27	3	14	7	16
1324	719	10.7	+50 3	13.5	A2	4.57	..	..	1	00	..	..	3	30	4	15
1327	720	11.2	+64 54	2.3	F	5.40	..	..	4	08	3	*05*	5	*09*	12	*02*
1335	727	13.1	+60 30	3.3	K	5.67	..	..	3	03	..	..	3	*02*	6	00
1342	730	13.7	+56 16	5.1	A	5.90	..	..	3	03	..	..	3	06	6	04
1352	734	14.4	+59 23	3.6	A	6.15	..	..	4	*16*	..	..	3	*04*	7	*10*
1401	767	21.9	+72 20	1.4	A5	5.97	19	07	16	12	..	..	13	*08*	48	04
1417	779	24.1	+53 42	7.2	B1	5.42	..	..	3	07	1	06	1	10	5	08
1440	786	27.1	+64 3	2.5	A	5.91	..	..	3	04	..	..	6	*01*	9	02
1466	800	32.0	+53 17	7.7	A	5.44	..	..	3	03	2	28	1	*02*	6	10
1467	801	32.0	+52 53	8.2	G 5	5.31	..	..	1	06	1	33	2	14	4	18
1511	825	39.7	+56 35	4.9	A	5.35	..	..	4	03	1	08	5	13	10	08
1527	831	42.7	+63 20	2.6	Mb	5.81	..	..	3	07	2	*21*	7	*11*	12	*08*
1542	836	44.1	+66 10	2.1	B	4.38	18	09	11	24	5	*03*	19	*06*	53	06
1555	848	46.9	+55 6	5.9	A	5.58	..	..	4	18	4	*06*	4	02	12	05
1561	853	48.2	+52 42	8.5	A2	5.75	..	..	4	12	4	*11*	2	*01*	10	00
1568	856	49.3	+53 35	7.3	A2	4.44	..	..	5	06	5	15	4	04	14	08
1603	876	54.5	+60 18	3.3	G	4.22	17	09	13	20	7	*04*	11	08	48	08
1622	885	57.4	+58 50	3.8	B3	5.31	..	..	05	*18*	2	*15*	12	*02*	19	*12*
1637	891	58.8	+51 29	10.4	F	4.99	..	..	3	*10*	2	11	1	*06*	6	*02*
1683	918	5 5.9	+73 9	1.3	A	5.76	20	*03*	20	16	4	*10*	9	04	53	02
1720	938	11.0	+62 33	2.7	K	5.88	18	04	15	18	6	*06*	4	*04*	43	03
1751	953	14.9	+57 27	4.4	A	5.25	..	..	4	08	2	*01*	8	*05*	14	01
1802	980	20.7	+62 59	2.7	Ma	5.75	18	*01*	16	22	10	*10*	5	*08*	49	01
1866	1009	28.4	+54 20	6.6	K	5.96	..	..	3	00	5	08	2	00	10	03
1916	1031	32.4	+65 38	2.2	K	5.78	19	15	12	21	7	*04*	3	*07*	41	06
1969	1051	38.1	+56 5	5.2	A	6.06	..	..	5	*03*	5	*01*	2	00	12	*01*
2027	1078	46.0	+59 52	3.4	A	5.26	..	..	3	*03*	6	*02*	2	48	11	14
2029	1079	46.5	+55 41	5.4	A2	4.92	..	..	3	11	6	05	2	*10*	11	02
2077	1093	51.3	+54 17	6.6	K	3.88	..	..	3	*09*	8	09	2	*02*	13	*01*
2152	1129	6 1.1	+58 57	3.8	K	5.42	..	..	4	*16*	3	01	3	08	10	*02*
2165	1135	2.8	+65 44	2.2	K	5.39	..	..	3	*12*	1	*33*	4	06	8	*13*
2201	1149	6.7	+60 2	3.4	K	5.56	..	..	4	*07*	4	00	4	*10*	12	*06*
2209	1155	7.8	+69 21	1.7	A	4.73	23	22	22	13	5	06	6	09	56	12
2215	1159	8.7	+61 33	3.0	Ma	5.30	20	04	20	11	5	*09*	6	*11*	51	*01*
2238	1168	10.8	+59 3	3.7	A	4.42	..	..	5	*09*	4	*02*	3	*05*	12	*05*

H. R.	H. P.	R.A. 1900.	Dec. 1900.	Path.	Spect.	Magn.	14		23		44		45		All.	
							No.	Res.	No.	Res.	No.	Res.	No.	Res.	No.	Res.
		h. m.	° ′													
2264	1182	6 13.7	+53 30	7.4	F	5.41	..	..	3	06	3	*04*	..	..	6	01
2291	1198	18.0	+56 20	5.0	A	5.50	..	..	3	*14*	2	08	2	14	7	03
2293	1197	18.1	+58 28	4.0	G5	5.48	..	..	3	*02*	4	*14*	2	*10*	9	*09*
2365	1219	25.4	+73 46	1.3	F	6.22	20	23	24	13	4	03	7	*03*	55	09
2402	1237	29.2	+56 56	4.7	A	5.75	..	..	3	06	1	*01*	4	10	8	05
2470	1261	37.4	+59 33	3.6	A 2	4.89	..	..	4	*21*	3	*01*	6	*06*	13	*09*
2477	1264	38.3	+57 17	4.5	K	5.47	..	..	4	*08*	3	04	6	*03*	13	*02*
2490	1270	40.5	+67 41	1.9	B3	5.04	18	30	26	19	8	00	12	05	64	14
2511	1279	42.9	+69 0	1.7	B5	5.13	..	..	3	*07*	4	*13*	6	*07*	13	*09*
2520	1289	44.2	+59 34	3.5	F	5.44	..	..	5	*05*	5	02	2	*11*	12	*05*
2560	1302	48.6	+58 33	3.9	K	4.54	..	..	5	*02*	5	*14*	4	*08*	14	*08*
2703	1352	7 5.6	+51 36	10.2	Ma	5.69	..	..	4	*05*	3	*14*	1	51	8	11
2715	1356	7.2	+59 49	3.5	G5	5.33	18	08	25	12	10	*07*	11	08	64	05
2737	1365	9.7	+52 18	9.0	K	6.04	..	..	5	00	2	*24*	2	*30*	9	*18*
2751	1367	10.9	+49 38	14.6	A2	4.80	..	..	..	..	1	50	..	..	1	50
2783	1378	14.7	+55 28	5.6	B8	5.22	..	..	5	*01*	6	11	6	16	17	09
2830	1395	20.5	+68 40	1.8	G8	5.80	18	10	25	07	17	*09*	23	*12*	83	*01*
2849	1404	22.3	+49 53	13.9	F5	5.36	..	..	..	..	1	*10*	..	..	1	*10*
2946	1441	34.5	+58 57	3.8	A5	4.96	..	..	5	*08*	9	15	15	07	29	05
2969	1448	36.5	+50 40	12.1	A	5.28	..	..	4	*08*	2	*38*	..	..	6	*23*
2975	1450	37.1	+65 42	2.2	K	6.00	..	..	3	*08*	10	*14*	19	*01*	32	*08*
3075	1478	48.2	+74 11	1.2	K	5.56	21	05	28	02	10	*06*	22	01	81	00
3106	1489	53.0	+59 20	3.6	F	5.79	..	..	4	*06*	6	*16*	13	04	23	*06*
3109	1490	53.2	+60 36	3.2	A	6.00	..	..	4	*02*	3	06	5	07	12	04
3112	1493	53.7	+63 21	2.6	F	6.04	18	19	23	12	6	02	16	08	63	10
3173	1509	8 0.9	+51 48	9.9	A2	4.87	..	..	5	*08*	2	*19*	3	01	10	*09*
3175	1510	1.9	+58 33	3.9	G5	6.05	..	..	4	*09*	5	*03*	5	*08*	14	*07*
3182	1513	2.9	+68 46	1.8	K	5.48	15	04	20	07	7	00	12	*14*	54	*01*
3200	1519	5.8	+56 46	4.8	K	5.90	..	..	3	*04*	5	08	5	04	13	03
3235	1530	9.5	+59 53	3.4	A	5.52	..	..	4	*09*	4	10	7	08	15	03
3245	1532	10.6	+62 49	2.7	G	5.77	..	..	4	*05*	3	08	4	*11*	11	*03*
3254	1534	12.4	+58 3	4.1	F2	5.94	..	..	3	*08*	2	*10*	3	16	8	*01*
3277	1540	16.2	+53 33	7.4	A	5.58	..	..	3	19	5	*01*	2	*22*	10	*01*
3303	1547	20.4	+67 38	1.9	G2	6.01	..	..	7	*17*	3	*28*	2	27	12	*06*
3323	1558	22.0	+61 3	3.1	G	3.47	15	*01*	22	18	10	11	10	08	57	09
3354	1566	25.6	+65 29	2.2	A	5.39	..	..	6	*07*	7	03	4	16	17	04
3391	1580	30.3	+65 22	2.2	G5	5.69	..	..	6	*04*	8	*08*	2	*07*	16	*06*
3400	1581	30.9	+53 45	7.1	F8	5.74	..	..	7	*15*	6	02	7	00	20	*04*
3403	1584	31.5	+64 40	2.4	K	4.76	16	17	21	15	10	*10*	11	00	58	06
3408	1585	31.9	+53 4	7.9	F5	6.03	..	..	6	*08*	4	09	8	00	18	00
3470	1601	39.8	+67 5	2.0	A	6.15	..	..	7	*14*	5	*21*	5	*11*	17	*15*
3505	1615	45.2	+62 20	2.8	A	5.72	..	..	6	*14*	4	02	9	*08*	19	*07*
3531	1624	48.1	+64 59	2.3	F8	5.62	..	..	6	*04*	6	01	3	*06*	15	*03*
3576	1638	53.5	+68 1	1.9	Ma	4.99	16	*10*	22	05	12	*03*	18	*10*	68	*04*
3592	1644	56.7	+54 41	6.2	A2	5.68	..	..	4	*05*	5	*23*	13	00	22	*09*

H. R.	H. P.	R.A. 1900.	Dec. 1900.	Path.	Spect.	Magn.	14		23		44		45		All.	
							No.	Res.	No.	Res.	No.	Res.	No.	Res.	No.	Res.
		h. m.	° ′													
3609	1651	8 59.6	+67 17	2.0	K5	5.33	..	..	7	*02*	7	01	7	10	21	03
3616	1655	9 1.6	+67 32	1.9	F8	4.87	..	..	5	*08*	6	02	4	13	15	02
3619	1656	1.9	+52 0	9.5	A3 p	4.54	..	..	4	*10*	9	*10*	8	*07*	21	*09*
3624	1658	2.7	+63 55	2.5	F8 p	4.74	14	02	16	17	10	*07*	17	*07*	57	01
3648	1669	6.4	+61 50	2.9	F	5.23	12	13	11	24	8	04	6	02	37	11
3660	1674	8.5	+57 10	4.6	K	5.48	..	..	4	12	5	09	10	*04*	19	06
3662	1675	9.0	+54 26	6.5	A5	4.89	..	..	4	03	6	*03*	4	*06*	14	*02*
3698	1683	14.4	+57 8	4.6	Ma5	5.98	..	..	4	05	3	*09*	6	14	13	03
3757	1701	23.7	+63 30	2.6	F	3.75	14	*04*	17	14	8	*02*	10	*10*	49	*00*
3768	1705	25.4	+72 39	1.4	F	5.82	14	01	20	12	6	*08*	9	*10*	49	*01*
3775	1709	26.2	+52 8	9.3	F8	3.26	..	..	4	*04*	6	13	7	17	17	09
3799	1715	28.0	+52 30	8.7	A	4.65	..	..	4	*08*	6	*10*	6	*05*	16	*08*
3838	1730	33.7	+69 42	1.7	K	5.74	..	..	4	08	4	00	5	13	13	07
3870	1745	39.5	+57 35	4.4	Ma	5.36	..	..	4	23	4	*04*	7	*05*	15	05
3888	1753	43.9	+59 31	3.6	F	3.89	17	*22*	16	08	6	*04*	9	*03*	48	*05*
3894	1756	45.4	+54 32	6.4	A2	4.54	..	..	6	*11*	6	*02*	8	03	20	*03*
3917	1765	49.2	+50 17	13.0	A2	5.34	..	..	5	*04*	3	*08*	1	04	9	*03*
3922	1767	50.2	+57 54	4.2	K	5.99	..	..	4	*20*	4	*02*	9	08	17	*05*
3939	1774	53.0	+57 18	4.5	K	5.71	..	..	3	02	5	*02*	7	*03*	15	*01*
3954	1785	58.0	+54 23	6.5	F	5.74	..	..	5	*05*	3	*25*	4	*06*	12	*12*
4026	1807	10 10.8	+65 36	2.2	A3	5.74	16	00	26	08	15	*10*	18	*02*	75	*01*
4047	1817	13.4	+69 15	1.7	A	5.84	..	..	6	07	8	*06*	4	08	18	03
4072	1829	16.9	+66 4	2.1	A	4.92	18	16	27	29	14	07	15	05	74	14
4108	1843	23.6	+65 45	2.3	A	6.00	..	..	4	*12*	9	*05*	6	02	19	*05*
4112	1844	24.2	+56 30	4.9	F	4.84	..	..	4	05	10	17	10	*01*	24	07
4141	1861	28.7	+57 36	4.3	F	5.16	..	..	4	00	7	07	6	03	17	03
4165	1871	32.9	+54 12	6.7	K	5.72	..	..	4	07	10	*11*	6	*11*	20	*05*
4176	1876	34.7	+68 58	1.7	K	5.90	..	..	6	04	3	*02*	2	05	11	02
4178	1877	35.2	+66 14	2.1	K	5.12	..	..	5	*10*	4	03	1	00	10	*02*
4181	1878	35.9	+69 36	1.7	K	5.23	18	00	22	10	11	02	12	*10*	63	00
4187	1881	37.4	+57 43	4.3	A	5.79	..	..	4	*10*	6	*05*	8	*07*	18	*07*
4235	1894	45.0	+57 7	4.6	K	5.76	..	..	4	10	6	*03*	7	00	17	02
4236	1896	45.1	+59 51	3.5	K	5.66	..	..	5	03	5	07	4	*01*	14	03
4246	1901	47.6	+55 7	5.9	K	5.36	..	..	4	03	8	*10*	5	03	17	*01*
4295	1923	55.8	+56 55	4.7	A	2.44	..	..	4	16	6	19	6	03	16	13
4301	1926	57.6	+62 17	2.8	K	1.95	18	*14*	21	19	13	11	17	12	69	07
4330	1936	11 3.3	+67 45	1.9	A	6.09	..	..	3	*05*	5	*07*	5	*11*	13	*08*
4367	1955	11.1	+50 1	13.6	K	5.97	..	..	3	02	2	*03*	1	*18*	6	*06*
4391	1966	16.9	+64 53	2.3	A	5.98	19	27	24	05	15	*10*	17	02	75	06
4407	1974	20.4	+56 24	5.0	K	5.85	..	..	3	01	12	*09*	14	*09*	29	*06*
4421	1979	23.4	+62 19	2.8	F	5.86	..	..	3	*08*	8	*12*	8	00	19	*07*
4424	1981	24.2	+57 17	4.5	A	6.13	..	..	3	*24*	11	*14*	10	*03*	24	*14*
4434	1988	25.5	+69 53	1.6	Ma	4.06	19	*16*	25	12	16	04	14	08	74	02
4439	1989	26.7	+61 38	3.0	F	5.47	..	..	3	09	2	09	1	09	6	09
4457	1997	29.6	+55 20	5.7	A	5.76	..	..	6	00	14	*08*	5	*06*	25	*05*

H. R.	H. P.	R.A. 1900.	Dec. 1900.	Path.	Spect.	Magn.	14		23		44		45		All.	
							No.	Res.	No.	Res.	No.	Res.	No.	Res.	No.	Res.
		h. m.	° ′													
4461	1999	11 30.2	+69 53	1.6	K	5.36	...	..	3	18	6	08	1	*21*	10	02
4474	2004	32.4	+51 10	11.0	K	5.99	..	..	4	*25*	6	*05*	1	*17*	11	*16*
4504	2015	36.9	+67 18	2.0	Ma	5.48	19	04	27	07	13	*01*	9	03	68	03
4521	2020	41.6	+56 11	5.1	K	5.41	..	..	3	*08*	9	*09*	9	*04*	21	*07*
4554	2036	48.6	+54 15	6.6	A	2.54	..	..	3	02	8	*04*	9	*02*	20	*01*
4566	2043	50.7	+57 9	4.6	G5	5.93	..	..	3	*17*	6	*09*	8	*05*	17	*10*
4610	2058	12 0.6	+63 30	2.6	K	6.24	16	11	22	15	12	*07*	7	*09*	57	02
4660	2077	10.5	+57 35	4.4	A2	3.44	..	..	5	*03*	10	*03*	7	*16*	22	*07*
4701	2096	16.1	+58 25	4.0	K	5.72	..	..	5	04	11	00	7	*06*	23	*01*
4716	2102	19.2	+52 7	9.3	K	4.97	..	..	7	07	10	*08*	5	*21*	22	*07*
4727	2107	20.4	+64 22	2.4	K	6.37	19	11	30	08	16	05	10	04	75	07
4745	2114	22.8	+56 16	5.1	Ma	5.84	..	..	3	05	7	14	2	*05*	12	05
4760	2122	25.3	+58 57	3.8	A5	5.44	..	..	3	13	5	00	2	*12*	10	00
4765	2124	25.7	+69 45	1.7	Ma	5.25	20	*15*	24	17	16	04	9	05	69	04
4833	2159	37.2	+63 16	2.6	A	5.92	..	..	4	13	8	04	1	*08*	13	03
4859	2171	43.0	+63 20	2.6	A	5.83	..	..	3	05	10	03	3	13	16	07
4863	2173	43.5	+67 20	2.0	G5	5.67	..	..	3	17	8	03	2	*16*	13	01
4867	2177	44.3	+60 52	3.1	F	5.87	..	..	3	09	6	02	1	07	10	06
4905	2191	49.6	+56 30	4.9	Ap	1.68	..	..	7	17	11	20	5	11	23	16
4916	2197	51.5	+65 59	2.2	F	5.27	21	*03*	28	20	9	01	12	10	70	07
4917	2198	51.9	+54 39	6.3	A	5.84	..	..	3	*15*	5	*10*	7	*03*	15	*09*
4928	2206	56.2	+67 8	2.0	K	5.50	..	..	3	14	3	01	3	09	9	08
4931	2207	56.5	+56 55	4.7	F	4.89	..	..	3	*10*	3	02	11	*07*	17	*05*
4934	2209	57.9	+64 9	2.4	F	6.02	17	06	24	16	9	*04*	14	02	64	05
5018	2250	13 13.2	+68 56	1.8	A	6.11	20	*11*	16	15	5	04	11	*05*	52	01
5023	2253	14.0	+50 12	13.1	A	5.13	..	..	5	03	4	20	1	*24*	10	00
5054	2264	19.9	+55 27	5.6	Ap	2.40	..	..	3	*02*	3	*16*	10	*12*	16	*10*
5062	2267	21.2	+55 30	5.6	A5	4.02	..	..	3	16	7	07	11	*05*	21	06
5085	2279	24.8	+60 28	3.3	A	5.41	19	*16*	23	04	12	*03*	10	*01*	64	*04*
5109	2298	30.3	+55 52	5.3	Ap	5.48	..	..	3	*02*	11	01	5	02	19	00
5142	2309	35.7	+53 26	7.5	A2	5.28	..	..	3	02	6	*04*	2	*14*	11	*05*
5154	2315	36.9	+55 12	5.8	Ma	4.75	..	..	3	08	10	06	3	*07*	16	02
5162	2320	38.4	+65 20	2.3	A	5.70	..	..	3	*08*	6	*18*	..	..	9	*13*
5169	2325	40.1	+52 32	8.7	A	5.82	..	..	3	*13*	5	06	..	..	8	*04*
5187	2337	42.9	+54 56	6.0	Ap	5.53	..	..	3	03	7	02	1	*20*	11	*05*
5191	2338	43.6	+49 49	14.1	B3	1.91	..	..	11	11	83	34	83	24	177	23
5213	2348	46.5	+61 59	2.9	K	6.05	20	*08*	25	15	15	*08*	7	*02*	67	*01*
5226	2356	48.5	+65 13	2.3	Ma	4.77	20	*03*	23	23	9	*04*	5	*06*	57	02
5238	2362	50.1	+54 13	6.7	A2	5.65	..	..	3	*12*	5	*11*	4	*32*	12	*18*
5291	2381	14 1.7	+64 51	2.3	A	3.64	..	..	5	*01*	5	03	4	01	14	01
5300	2383	4.6	+49 56	13.8	Mb	5.44	..	..	3	04	..	..	..	..	3	04
5328	2395	9.9	+52 16	9.1	A5	4.44	..	..	3	00	4	*16*	6	*18*	13	*11*
5334	2399	10.2	+69 54	1.6	Ma	5.36	21	12	22	20	10	*01*	4	00	57	08
5350	2404	12.6	+51 50	9.8	A5	4.78	..	..	5	01	3	02	2	*10*	10	*02*
5404	2426	21.8	+52 19	9.0	F8	4.06	..	..	3	19	6	*02*	3	02	12	06

H. R.	H. P.	R.A. 1900.	Dec. 1900.	Path.	Spect.	Magn.	14		23		44		45		All.	
							No.	Res.	No.	Res.	No.	Res.	No.	Res.	No.	Res.
		h. m.	° ′													
5420	2432	14 25.2	+50 18	13.0	G5	5.61	..	..	3	03	1	*12*	..	..	4	*04*
5436	2438	28.4	+63 38	2.5	F	6.04	..	..	4	*06*	7	00	4	02	15	*01*
5442	2441	29.4	+55 50	5.3	K	5.99	..	..	3	*03*	7	*09*	1	*19*	11	*10*
5452	2443	31.2	+49 48	14.2	K	5.90	..	..	..	..	1	09	..	..	1	09
5467	2447	35.1	+54 27	6.4	A	5.52	..	..	3	04	8	16	3	17	14	12
5492	2460	39.5	+61 41	2.9	F	6.17	22	*25*	23	14	13	03	7	01	65	*02*
5552	2493	48.9	+59 42	3.5	K	5.67	..	..	3	06	7	*14*	2	*13*	12	*07*
5563	2500	51.0	+74 34	1.2	K5	2.24	23	*02*	22	04	10	20	6	03	61	06
5581	2504	53.0	+50 3	13.5	F	5.68	..	..	6	*08*	2	*46*	..	..	8	*27*
5589	2510	56.0	+66 20	2.1	Mb	4.86	22	00	17	13	11	*07*	2	*03*	52	01
5608	2518	59.1	+60 36	3.2	A	5.89	..	..	3	*06*	7	*15*	3	*04*	13	*08*
5629	2528	15 2.4	+66 18	2.1	A	6.09	..	..	3	*14*	2	07	..	..	5	*04*
5635	2529	3.4	+54 56	6.0	G2	5.21	..	..	3	*05*	6	*03*	2	15	11	02
5691	2545	13.5	+67 44	1.9	G	5.23	..	..	3	24	5	02	4	03	12	10
5715	2552	17.2	+52 17	9.1	A3	5.52	..	..	4	12	4	*07*	1	*20*	9	*05*
5731	2564	20.7	+62 23	2.8	A	5.80	..	..	3	*12*	7	12	2	01	12	00
5735	2566	20.9	+72 11	1.4	A2	3.14	22	*10*	20	06	8	*05*	3	*08*	53	*03*
5737	2565	21.0	+63 42	2.5	K	5.78	..	..	3	*09*	6	06	1	03	10	00
5744	2569	22.7	+59 19	3.6	K	3.47	26	*01*	16	*01*	8	01	3	04	53	01
5785	2593	29.6	+64 33	2.4	G5	5.88	23	*16*	14	02	5	*07*	2	*06*	44	*07*
5818	2608	33.4	+54 57	6.0	A	5.74	..	..	3	04	5	01	1	01	9	02
5835	2617	35.7	+50 45	11.9	G2	5.94	..	..	3	06	1	*33*	..	..	4	*14*
5844	2624	37.4	+69 36	1.7	K	5.86	..	..	3	11	6	*04*	1	*16*	10	*03*
5857	2630	40.2	+52 40	8.5	Ap	5.48	..	..	6	12	3	04	3	04	12	07
5886	2644	45.1	+62 55	2.7	A2	5.13	..	..	3	02	4	*01*	4	00	11	00
5887	2642	45.2	+55 41	5.4	A	5.79	..	..	5	24	6	15	5	06	16	15
5922	2661	50.0	+56 7	5.2	K	5.92	..	..	3	01	4	16	3	*13*	10	01
5960	2680	55.4	+55 2	5.9	A5	4.96	..	..	4	06	7	14	4	10	15	10
5964	2682	56.2	+50 10	13.2	A	5.90	..	..	3	*03*	1	*20*	..	..	4	*12*
5986	2696	16 0.0	+58 50	3.8	F8	4.11	23	*28*	18	14	11	04	9	*01*	61	*03*
6025	2717	6.0	+68 4	1.9	A	5.40	27	*03*	17	07	7	*03*	10	03	61	01
6086	2741	15.6	+60 0	3.4	Mb	5.64	..	..	5	*21*	4	07	8	*11*	17	*08*
6126	2765	22.0	+69 20	1.7	K	5.44	..	..	5	*03*	6	*06*	5	*02*	16	*04*
6127	2763	22.2	+55 26	5.6	A	5.66	..	..	3	00	5	17	8	*07*	16	03
6132	2766	22.6	+61 44	2.9	G5	2.89	28	*21*	16	14	8	03	8	00	60	*01*
6161	2781	28.2	+68 59	1.7	B8p	4.98	24	*20*	18	18	7	*06*	6	11	55	01
6170	2789	31.0	+61 2	3.1	A	5.85	..	..	3	11	4	*02*	5	05	12	05
6184	2796	33.8	+53 6	7.9	B8	5.64	..	..	5	*07*	4	*17*	1	*62*	10	*29*
6185	*2794*	33.9	+53 8	7.9	A2	5.20	..	..	5	04	5	06	..	..	10	05
6199	2803	36.0	+56 13	5.1	G2	5.44	..	..	3	05	3	13	6	*05*	12	04
6223	2813	40.2	+64 47	2.3	K5	5.00	25	*05*	13	09	6	*01*	7	00	51	01
6237	2820	43.4	+56 58	4.7	F5	4.88	..	..	3	05	8	03	7	*01*	18	02
6315	2843	55.4	+65 17	2.3	F5	4.82	..	..	3	*14*	4	08	7	10	14	01
6335	2854	58.3	+73 17	1.3	A	6.24	27	02	18	02	10	06	10	02	65	03
6369	*2865*	17 3.2	+54 36	6.3	F5	5.06	..	..	3	12	9	03	3	*04*	15	04

H. R.	H. P.	R.A. 1900.		Dec. 1900.		Path.	Spect.	Magn.	14		23		44		45		All.	
									No.	Res.	No.	Res.	No.	Res.	No.	Res.	No.	Res.
		h.	m.	°	′													
6396	2878	17	8.5	+65	50	2.2	B5	3.22	26	*05*	15	16	8	01	8	00	57	03
6421	2887		11.7	+62	59	2.7	A	5.47	..	..	3	01	10	08	8	05	21	05
6399	2894		14.3	+49	48	14.2	A	6.05	..	..	..	..	..	..	..	..	..	..
6479	2913		19.6	+53	31	7.4	K	5.95	..	..	4	02	11	03	4	*14*	19	*03*
6511	2928		24.4	+60	7	3.4	A3	5.66	..	..	4	13	5	*07*	6	*04*	15	01
6536	2937		28.2	+52	23	8.9	G	2.99	..	..	4	*02*	9	07	6	03	19	03
6554	2945		30.2	+55	15	5.7	A5	4.98	..	..	4	*12*	4	07	2	*12*	10	*06*
6555	2946		30.3	+55	14	5.7	A5	4.95	..	..	4	*20*	4	*05*	..	..	8	*12*
6566	2951		32.4	+68	12	1.8	K	5.21	..	..	5	05	6	08	2	13	13	09
6573	2955		33.9	+61	58	2.9	F	5.31	24	*04*	18	16	11	*08*	5	*08*	58	*01*
6596	2964		37.5	+68	48	1.8	F5	4.87	24	*14*	17	06	10	*08*	6	00	57	*04*
6618	2975		41.9	+53	50	7.0	A	5.70	..	..	4	13	9	*09*	5	03	18	02
6636	2985		43.7	+72	12	1.4	F5	4.58	20	*20*	14	04	6	00	4	*14*	44	*08*
6656	2989		46.7	+50	48	11.8	A	5.19	..	..	5	05	2	*08*	1	26	8	08
6688	3003		51.8	+56	53	4.7	K	3.90	..	..	3	03	9	08	3	*07*	15	01
6705	3009		54.3	+51	30	10.4	K5	2.42	..	..	3	*07*	7	03	2	21	12	06
6792	3057	18	4.6	+49	42	14.4	A	6.31	..	..	..	..	2	*08*	...	..	2	*08*
6817	3066		8.4	+54	15	6.6	G5	5.94	..	..	5	*08*	3	*08*	3	14	11	*01*
6850	3081		13.3	+64	22	2.4	F5	5.03	23	*09*	20	00	7	*04*	5	*07*	55	*05*
6920	3120		22.2	+71	17	1.5	Ap	4.24	19	02	20	07	7	16	5	*13*	51	03
6923	3116		22.5	+58	45	3.9	A2	4.85	..	..	4	*02*	6	*03*	4	08	14	01
6927	3122		22.9	+72	41	1.4	F8	3.69	23	*14*	16	06	8	03	2	*11*	49	*04*
6945	3126		25.7	+65	30	2.2	K	4.99	21	*07*	11	18	6	*01*	1	02	39	03
6978	3136		30.9	+56	58	4.7	F8 p	4.95	..	..	4	*12*	8	*21*	3	*07*	15	*13*
6983	3141		31.6	+52	16	9.1	K	5.42	..	..	3	*02*	5	*06*	..	..	8	*04*
7013	3152		35.9	+65	24	2.2	A	6.00	..	..	3	*15*	3	*18*	..	..	6	*16*
7018	3153		36.7	+62	26	2.8	A	5.60	..	..	3	*12*	5	07	1	10	9	02
7028	3155		37.5	+52	6	9.3	A	5.85	..	..	3	*01*	4	*18*	..	..	7	*10*
7042	3163		40.0	+62	39	2.7	K	6.01	..	..	3	*06*	4	16	..	..	7	05
7049	3166		40.7	+55	26	5.6	A	5.08	..	..	3	08	6	*15*	..	..	9	*04*
7084	3187		44.5	+52	53	8.2	A	5.76	..	..	3	08	4	*06*	..	..	7	01
7123	3205		49.3	+52	50	8.3	G5	5.62	..	..	3	02	3	*15*	1	10	7	*01*
7125	3206		49.7	+59	16	3.7	K	4.78	..	..	3	*14*	3	04	3	*02*	9	*04*
7137	3214		50.7	+50	35	12.3	K	4.97	..	..	3	*03*	2	21	..	..	5	09
7175	3233		55.1	+57	41	4.3	K	5.71	..	..	3	*12*	..	..	3	07	6	*02*
7187	3244		56.0	+65	8	2.3	K	5.78	..	..	4	04	..	..	2	*12*	6	*04*
7210	3249		57.7	+50	24	12.7	B3	5.24	..	..	3	13	1	16	..	..	4	14
7218	3255		58.8	+55	31	5.5	K	5.52	..	..	3	17	1	15	2	12	6	15
7251	3268	19	2.6	+53	14	7.7	A	5.35	..	..	3	02	2	11	..	..	5	06
7295	3289		9.7	+56	41	4.8	K	5.24	..	..	5	*05*	1	*20*	2	27	8	01
7309	3302		12.1	+57	32	4.4	K	5.26	..	..	5	00	2	*08*	3	*04*	10	*04*
7310	3307		12.5	+67	29	1.9	K	3.24	22	*07*	26	12	14	*01*	6	*02*	68	00
7328	3316		14.8	+53	11	7.8	K	3.98	..	..	5	*04*	8	*04*	2	*08*	15	*05*
7352	3328		17.5	+73	10	1.3	K	4.63	22	15	25	09	16	05	8	02	71	08
7356	3334		18.4	+57	28	4.4	K	6.10	..	..	5	*09*	7	02	4	*06*	16	*04*

H. R.	H. P.	R.A. 1900.		Dec. 1900.		Path.	Spect.	Magn.	14		23		44		45		All.	
		h.	m.	°	′				No.	Res.	No.	Res.	No.	Res.	No.	Res.	No.	Res.
7371	3345	19	20.2	+65	31	2.2	A2	4.63	..	..	6	*08*	6	*04*	3	*07*	15	*06*
7408	3361		25.0	+52	7	9.3	A	5.66	..	..	6	08	2	15	3	*18*	11	02
7420	3365		27.2	+51	31	10.4	A2	3.94	..	..	6	*05*	7	*19*	3	10	16	*05*
7427	3367		28.7	+50	6	13.4	K	5.73	..	..	4	*01*	2	*53*	..	..	6	*27*
7451	3384		31.8	+51	1	11.3	F	5.65	..	..	4	*08*	1	*14*	1	00	6	*07*
7462	3389		32.6	+69	29	1.7	G5	4.78	21	*09*	23	12	6	08	6	*05*	56	02
7484	3404		36.4	+54	44	6.2	F8	5.86	..	..	5	*13*	3	13	3	04	11	01
7503	*3410*		39.1	+50	18	12.9	F	5.56	..	..	4	*02*	1	22	..	..	5	10
7545	3428		44.4	+69	6	1.7	A	5.90	..	..	4	*13*	4	04	2	07	10	*01*
7576	3440		48.2	+52	45	8.4	K	5.17	..	..	4	*13*	3	*05*	3	*22*	10	*13*
7582	3447		48.5	+70	1	1.6	K	3.99	21	09	26	04	8	03	5	04	60	05
7608	3455		51.2	+57	16	4.5	B5	5.04	..	..	4	05	4	02	3	09	11	05
7611	3457		51.8	+59	27	3.6	A	6.03	..	..	3	*04*	4	*02*	..	..	7	*03*
7619	3463		53.0	+52	10	9.2	A3	4.80	..	..	4	*03*	2	02	1	*07*	7	*03*
7633	3468		54.1	+58	35	3.9	K	5.13	..	..	3	10	..	..	3	04	6	07
7651	3480		56.6	+51	47	9.9	B5	6.02	..	..	4	*05*	2	00	1	00	7	*02*
7676	3498	20	0.4	+64	32	2.4	Ma	5.43	14	*02*	28	00	10	*07*	9	04	61	*01*
7685	3506		2.3	+67	35	1.9	K	4.66	15	05	21	06	5	*01*	11	07	52	04
7697	3509		3.6	+52	51	8.2	A	5.72	..	..	3	*02*	2	*06*	2	35	7	09
7701	3511		4.0	+61	42	2.9	K	5.57	..	..	3	06	6	06	7	11	16	08
7727	3526		9.9	+61	47	2.9	F	5.72	..	..	3	*06*	6	00	6	*01*	15	*02*
7740	3532		11.1	+56	16	5.1	A3	4.32	..	..	3	09	4	*02*	7	*09*	14	*01*
7781	3556		15.9	+55	5	5.9	A	5.71	..	..	3	*02*	3	*01*	3	*09*	9	*04*
7792	3563		18.0	+61	56	2.9	A	5.61	..	..	3	*06*	3	09	3	07	9	03
7805	3571		19.8	+63	41	2.5	K5	5.92	..	..	3	*10*	1	16	4	*03*	8	01
7843	3590		27.0	+55	44	5.4	A	5.87	..	..	3	*01*	2	*17*	8	*03*	13	*07*
7850	3594		27.9	+62	39	2.7	A	4.28	15	*24*	18	*01*	4	04	12	*02*	49	*06*
7854	3596		28.5	+51	58	9.6	A	6.27	..	..	3	*23*	1	*35*	2	*01*	6	*20*
7925	3633		38.2	+60	9	3.4	F	5.95	..	..	3	*06*	3	*08*	7	10	13	*01*
7945	3650		41.9	+66	18	2.1	A	5.57	14	*06*	21	07	4	06	16	*05*	55	00
7955	3653		42.9	+57	13	4.5	G	4.63	..	..	3	*07*	3	*10*	11	*01*	17	*06*
7957	3656		43.3	+61	27	3.0	K	3.59	15	*16*	18	*03*	4	*02*	8	03	45	*04*
8025	3686		53.3	+50	20	12.8	A5	5.80	..	..	3	07	..	..	1	*09*	4	*01*
8049	3704		57.0	+59	2	3.7	K	5.75	..	..	3	08	5	03	9	03	17	05
8065	3711		59.4	+56	16	5.1	A	5.74	..	..	4	15	4	02	11	*01*	19	05
8106	3730	21	7.1	+53	9	7.8	A	5.73	..	..	6	01	5	*09*	6	10	17	01
8119	3736		9.3	+59	35	3.5	B1	5.65	..	..	6	*11*	3	04	6	*03*	15	*03*
8147	3748		13.9	+53	34	7.4	A	5.99	..	..	5	01	1	*14*	3	01	9	-*04*
8162	3757		16.2	+62	10	2.8	A5	2.60	15	*10*	17	06	11	*05*	11	*07*	54	*04*
8164	3758		16.5	+58	13	4.1	G	5.79	..	..	4	*10*	6	*08*	4	09	14	*03*
8171	3764		17.3	+64	27	2.4	B3	5.18	..	..	5	10	6	*08*	2	00	13	01
8179	3769		18.0	+60	21	3.3	K	6.24	..	..	6	26	2	*04*	2	*10*	10	04
8218	3787		23.4	+52	28	8.8	A	5.95	..	..	7	*28*	2	*17*	1	08	10	*12*
8227	3796		25.8	+66	22	2.1	B5	5.42	..	..	7	*04*	6	*02*	1	00	14	*02*
8237	3797		27.0	+52	31	8.7	A	6.08	..	..	6	*21*	4	*40*	1	*12*	11	*24*

H. R.	H. P.	R.A. 1900.		Dec. 1900.		Path.	Spect.	Magn.	14		23		44		45		All.	
									No.	Res.	No.	Res.	No.	Res.	No.	Res.	No.	Res.
		h.	m.	°	′													
8238	3798	21	27.4	+70	7	1.6	B1	3.32	15	*01*	15	08	13	07	12	*12*	55	00
8243	3801		28.3	+60	1	3.4	A	5.52	..	..	7	*13*	4	*08*	1	04	12	*06*
8279	3819		35.2	+61	38	3.0	B2	4.87	..	..	5	*08*	5	05	2	12	12	03
8281	3821		35.9	+57	2	4.6	Oe 5	5.64	..	..	6	*10*	2	06	1	*07*	9	*04*
8301	3833		38.6	+50	44	11.9	B3	4.78	..	..	5	09	2	*06*	3	11	10	05
8327	3854		42.2	+61	59	2.9	G	5.97	..	..	6	08	3	05	3	09	12	07
8334	3855		42.6	+60	40	3.2	A2 p	4.46	14	00	20	14	8	05	5	*02*	47	04
8339	3859		44.5	+60	14	3.3	Ma	5.64	..	..	6	*01*	3	*02*	3	08	12	02
8357	3870		48.8	+55	20	5.7	B3	5.54	..	..	6	*01*	1	*15*	3	*12*	10	*09*
8383	3879		53.8	+63	9	2.6	Ma	5.35	..	..	5	*18*	2	*18*	1	*19*	8	*18*
8400	3892		57.8	+72	42	1.4	F	5.15	14	03	24	05	6	00	7	*14*	51	*02*
8403	3890		58.2	+52	24	8.9	A	5.66	..	..	6	*06*	1	*13*	4	00	11	*06*
8406	3894		58.7	+57	31	4.4	A	5.50	..	..	5	*01*	2	02	4	27	11	09
8416	3904	22	0.8	+62	38	2.7	Mb	5.46	..	..	4	*04*	2	06	3	13	9	05
8417	3903		0.9	+64	8	2.5	A8	4.40	14	*16*	18	12	5	05	5	06	42	02
8426	3906		2.0	+62	18	2.8	K5	5.39	..	..	3	03	2	*05*	1	31	6	10
8428	3909		2.1	+61	48	2.9	Oe 5	5.17	..	..	3	*01*	2	07	1	*15*	6	*03*
8463	3922		7.2	+50	20	12.8	A	5.44	..	..	4	00	..	..	4	03	8	02
8465	3923		7.4	+57	42	4.3	K	3.62	..	..	3	*08*	1	*31*	3	*01*	7	*13*
8469	3929		8.1	+58	56	3.8	Od	5.19	..	..	3	10	2	00	1	01	6	04
8472	3926		8.2	+56	21	5.0	F8	5.42	..	..	3	*06*	1	*02*	3	*02*	7	*03*
8474	3931		8.4	+69	38	1.7	F	5.54	..	..	3	*03*	2	*06*	1	00	6	*03*
8479	3932		8.7	+60	16	3.3	K	5.52	..	..	3	*09*	3	*13*	..	..	6	*11*
8494	3942		11.3	+56	33	4.9	A5	4.23	..	..	4	01	4	04	1	05	9	03
8538	3959		19.6	+51	44	10.0	K	4.58	..	..	4	*06*	2	02	3	*04*	9	*03*
8557	3969		23.5	+70	16	1.6	K	5.69	15	10	21	*01*	7	*14*	8	*05*	51	*02*
8561	3974		23.9	+64	37	2.4	B0	5.66	..	..	4	*11*	3	*08*	4	01	11	*06*
8585	3987		27.2	+49	46	14.3	A	3.85	..	..	..	..	4	25	..	..	4	25
8595	3995		30.1	+69	24	1.7	A	6.02	..	..	4	*01*	2	*18*	2	00	8	*06*
8613	4001		33.2	+51	1	11.3	A5	4.83	..	..	5	*03*	1	17	2	07	8	07
8621	4004		34.7	+56	17	5.1	Mb	5.47	..	..	5	16	1	10	5	02	11	09
8627	4009		35.1	+63	4	2.6	A2	5.21	14	*10*	16	11	10	05	10	04	50	02
8633	4012		36.2	+53	20	7.6	K	6.10	..	..	4	*06*	1	*16*	2	*04*	7	*09*
8648	4019		38.2	+53	23	7.6	K	6.26	..	..	6	*22*	1	08	2	16	9	01
8682	4032		44.6	+53	53	7.0	A	6.08	..	..	6	*05*	2	*14*	2	*11*	10	*10*
8688	4035		45.6	+55	22	5.7	K	5.56	..	..	6	*17*	5	04	3	06	14	*02*
8694	4037		46.1	+65	40	2.2	K	3.68	13	08	18	04	8	13	5	04	44	07
8696	4041		47.4	+61	10	3.1	F	5.80	..	..	5	*04*	8	*11*	5	*03*	18	*06*
8752	4070		55.9	+56	24	5.0	G	5.48	..	..	6	15	7	*02*	2	02	15	05
8779	4082		59.7	+66	40	2.1	K	5.50	..	..	6	*08*	4	*23*	1	*10*	11	*14*
8797	4086	23	2.4	+58	53	3.8	B	4.93	..	..	6	06	5	*09*	4	01	15	*01*
8819	4098		4.7	+74	51	1.2	G5	4.56	15	06	19	02	6	*01*	6	*12*	46	*01*
8822	4099		5.4	+58	47	3.8	A2	5.63	..	..	6	*24*	3	00	4	03	13	*07*
8832	4105		8.5	+56	37	4.9	K	5.65	..	..	6	*19*	2	*25*	3	03	11	*14*
8853	4116		12.1	+52	40	8.5	F	5.65	..	..	6	*01*	1	*22*	2	13	9	*03*

H. R.	H. P.	R.A. 1900.	Dec. 1900.	Path.	Spect.	Magn.	14		23		44		45		All.	
							No.	Res.	No.	Res.	No.	Res.	No.	Res.	No.	Res.
		h. m.	° ′													
8872	4127	23 14.5	+67 34	1.9	K	4.90	15	29	19	09	7	*01*	6	*01*	47	09
8894	4141	18.1	+59 35	3.5	K	5.93	..	..	5	06	4	*20*	4	*12*	13	*09*
8904	4144	20.4	+61 44	2.9	Map	5.20	..	..	6	*03*	6	04	4	06	16	02
8918	4150	23.1	+69 49	1.6	A	5.63	..	..	8	08	4	*03*	2	01	14	02
8926	4153	25.4	+58 0	4.2	B3	4.89	..	..	6	*13*	4	19	3	09	13	05
8972	4181	35.0	+73 25	1.3	G	6.08	15	05	21	02	9	*04*	7	*01*	52	00
8989	4191	37.6	+63 58	2.5	Ma	6.85	16	*26*	16	07	3	*14*	4	*05*	39	*10*
9005	4199	41.8	+66 13	2.1	B3	5.94	..	..	8	04	4	*06*	1	11	13	03
9008	4201	42.1	+58 6	4.1	K	5.09	..	..	6	07	6	05	5	08	17	07
9010	4202	42.2	+56 54	4.7	K	5.78	..	..	7	*05*	5	*04*	4	08	16	00
9013	4204	43.1	+67 15	2.0	A	5.02	..	..	8	07	2	*03*	3	04	13	03
9018	4206	44.0	+61 40	2.9	F	5.61	..	..	8	*08*	2	00	1	08	11	00
9045	4224	49.4	+56 57	4.7	F8p	4.85	..	..	7	*29*	7	09	2	05	16	*05*
9059	4232	52.1	+55 9	5.8	F5	5.69	..	..	8	*20*	3	*09*	1	*14*	12	*14*
9071	4237	53.9	+55 12	5.8	B2	4.93	..	..	8	03	4	15	1	*06*	13	04
9085	4243	56.5	+60 40	3.2	A	5.70	..	..	6	*04*	2	*06*	2	*06*	10	*05*
9104	4256	59.5	+66 36	2.1	K	5.84	15	22	16	13	7	*14*	5	*03*	43	04
9110	4258	59.9	+60 46	3.2	A	5.87	..	..	5	09	2	*14*	2	*16*	9	*07*

The observations contained in Table I extend over a period of twenty-three years. A secular change of brightness in a star might be more obvious from approximate magnitudes at long intervals than from precise measures at short intervals. Three early series of observations are available for this comparison, those of Ptolemy, of Sûfi, and of Sir William Herschel. All three of these have been reduced, in H.A. 14, to the scale of the Harvard Photometry. The results of these various determinations are given in Table III. The first seven columns give a number for reference, the H.R. number, the H.P. number, the right ascension for 1900, the declination for 1900, the class of spectrum and the H.R. magnitude. With the exception of the first column, they are taken from H.A. 50, Table I. The eighth and ninth columns give the magnitudes according to the observations of Ptolemy and Sûfi, found by adding the residuals, marked P and S in the right hand pages of H.A. 14, Table XXVII, to the photometric magnitudes given on the same pages. The tenth column gives the magnitude according to Sir William Herschel, found by adding the residual marked H, to the photometric magnitude given in the Revised Harvard Photometry. The eleventh column gives for each star the mean of the residuals in Table I added to the magnitude in the seventh column. The twelfth column gives the residuals, expressed in hundredths of a magnitude, found by subtracting the magnitude in the seventh column from those in the four columns following it. The last of these residuals is always small, and would be zero, except that equal weights have been given to the observations of each year instead of to those of each evening. The total number of nights on which each star was observed with the Meridian Photometer is given in the thirteenth column. The fourteenth column gives the average value of the residuals contained in Table I. The fifteenth column gives the apparent change in light per century indicated by the residuals in Table I. This quantity was found by taking the difference of the means of the residuals preceding, and of those following, 1890. The difference in the means of the times is about 12.8. Dividing the difference of the residuals by 12.8 and multiplying by 100 gives the mean change per century. A positive sign indicates that the star is growing fainter, a negative sign that it is growing brighter. The sixteenth and seventeenth columns relate to the observations at lower culmination, and give the number of observations and the mean residuals taken from the last two columns of Table II.

TABLE III.

RESULTS OF TABLE I.

No.	H. R.	H. P.	R.A. 1900.	Dec. 1900.	Spect.	H. R.	R.	S.	W. H.	1879–1902.	Resid.	No.	A. D.	Corr.	L. C.	
															No.	Res.
			h. m.	° ′												
1	21	9	0 3.8	+58 36	F5	2.42	3.3	3.2	2.45	2.41	88,78,03,*01*	174	.078	0.74	40	05
2	130	71	27.3	+62 23	B0	4.24	4.6	4.5	4.30	4.26	36,26,06,02	190	.056	0.12	38	07
3	192	104	39.0	+74 26	A2	5.59	. .	. .	5.60	5.57	. . . . 01,*02*	228	.097	1.49	38	14
4	264	142	50.7	+60 11	Bp	2.25	2.7	2.6	2.28	2.26	45,35,03,01	195	.052	*0.35*	32	04
5	336	184	1 3.9	+68 15	A0	5.34	. .	. .	5.30	5.35	. . . . *04*,01	210	.026	0.21	40	08
6	403	219	19.3	+59 43	A5	2.80	3.3	3.2	3.10	2.79	50,40,30,*01*	198	.035	*0.29*	45	08
7	542	287	47.2	+63 11	B5	3.44	4.4	4.2	4.40	3.45	96,76,96,01	244	.069	*0.45*	47	02
8	575	304	53.8	+70 25	A2	4.61	. .	4.2	4.70	4.61	. . *41*,09,00	235	.051	0.16	51	*01*
9	707	384	2 20.8	+66 57	A5	4.59	4.4	4.5	. .	4.59	*19,09*,. . 00	214	.055	0.38	41	06
10	743	401	28.5	+72 23	K0	5.34	. .	. .	. .	5.32	. . . . . . *02*	229	.046	*0.35*	53	00
11	860	456	48.0	+61 7	F2	5.63	. .	. .	. .	5.64	 01	186	.038	0.09	33	05
12	922	488	58.9	+63 41	A	5.82	. .	. .	. .	5.82	 00	181	.035	0.38	42	04
13	985	516	3 11.2	+65 17	B2 p	4.76	. .	. .	. .	4.80	 04	198	.071	0.66	43	00
14	1105	583	33.5	+62 54	Ma	5.32	. .	. .	. .	5.29	. . . . . . *03*	187	.092	*0.39*	42	04
15	1148	607	39.8	+71 1	A0	4.67	. .	. .	. .	4.68	 01	183	.068	0.60	43	*02*
16	1155	612	40.4	+65 13	Ma	4.71	. .	. .	. .	4.68	. . . . . . *03*	141	.120	0.09	32	*04*
17	1305	705	4 8.1	+61 36	B8	5.64	. .	. .	. .	5.65	 01	176	.046	0.12	37	07
18	1401	767	21.9	+72 20	A5	5.97	. .	. .	. .	5.96	. . . . . . *01*	212	.032	0.06	48	04

No.	H. R.	H. P.	R.A. 1900.	Dec. 1900.	Spect.	H. R.	R.	S.	W. H.	1879-1902.	Resid.	No.	A. D.	Corr.	L. C.	
															No.	Res.
			h. m.	° ′												
19	1542	836	4 44.1	+66 10	B0	4.38	..	..	4.20	4.37	....*18,01*	178	.037	0.30	53	06
20	1603	876	54.5	+60 18	G0	4.22	..	..	4.05	4.19	....*17,03*	178	.049	*0.05*	48	08
21	1683	918	5 5.9	+73 9	A	5.76	..	..	..	5.78	02	170	.059	0.70	53	02
22	1720	938	11.0	+62 33	K	5.88	..	..	..	5.83	......*05*	129	.064	*0.25*	43	03
23	1802	980	20.7	+62 59	Ma	5.75	..	..	5.77	5.71	....02,*04*	143	.073	*0.50*	49	01
24	1916	1031	32.4	+65 38	K	5.78	..	..	..	5.78	00	176	.062	*0.46*	41	06
25	2209	1155	6 7.8	+69 21	A0	4.73	..	..	..	4.75	02	231	.072	0.88	56	12
26	2215	1159	8.7	+61 33	Ma	5.30	..	..	5.20	5.29	....*10,01*	200	.067	*0.72*	51	*01*
27	2365	1219	25.4	+73 46	F	6.22	..	..	..	6.21	......*01*	217	.058	0.76	55	09
28	2490	1270	40.5	+67 41	B3	5.04	..	..	4.82	5.06	....*22*,02	224	.092	1.42	64	14
29	2715	1356	7 7.2	+59 49	G5	5.33	..	..	5.55	5.34	22,01	229	.039	*0.05*	64	05
30	2830	1395	20.5	+68 40	G8	5.80	..	..	..	5.78	......*02*	230	.057	0.54	83	*01*
31	3075	1478	48.2	+74 11	K	5.56	..	..	..	5.55	......*01*	223	.032	*0.12*	81	00
32	3112	1493	53.7	+63 21	F	6.04	..	..	..	6.05	01	208	.054	0.15	63	10
33	3182	1513	8 2.9	+68 46	K	5.48	..	..	5.50	5.48	02,00	191	.039	0.06	54	*01*
34	3323	1558	22.0	+61 3	G0	3.47	4.4	4.2	3.45	3.47	93,73,*02*,00	208	.048	0.41	57	09
35	3403	1584	31.5	+64 40	K0	4.76	5.0	4.9	5.17	4.76	24,14,41,00	197	.051	*0.47*	58	06
36	3576	1638	53.5	+68 1	Ma	4.99	5.0	4.9	5.00	4.97	01,*09*,01,*02*	186	.088	*0.95*	68	*04*
37	3624	1658	9 2.7	+63 55	F8 p	4.74	4.4	4.5	4.87	4.75	*34,24*,13,01	177	.055	0.15	57	01
38	3648	1669	6.4	+61 50	F	5.23	..	..	5.30	5.26	07,03	151	.047	0.22	37	11
39	3757	1701	23.7	+63 30	F0	3.75	4.4	4.2	4.00	3.73	65,45,25,*02*	153	.057	*0.18*	49	00
40	3768	1705	25.4	+72 39	F	5.82	..	..	5.80	5.79	....*02,03*	152	.063	0.55	49	*01*
41	3888	1753	43.9	+59 31	F0	3.89	4.4	4.2	4.20	3.90	51,31,31,01	158	.069	*0.24*	48	*05*
42	4026	1807	10 10.8	+65 36	A3	5.74	..	..	R	5.76	02	180	.060	0.05	75	*01*
43	4072	1829	16.9	+66 4	A0	4.92	..	..	..	4.91	......*01*	158	.075	0.20	74	14
44	4181	1878	35.9	+69 36	K	5.23	..	..	..	5.20	......*03*	198	.061	0.03	63	00
45	4301	1926	57.6	+62 17	K0	1.95	2.1	2.0	1.95	1.95	15,05,00,00	170	.041	*0.33*	69	07
46	4391	1966	11 16.9	+64 53	A	5.98	..	..	..	5.98	00	187	.049	0.16	75	06
47	4434	1988	25.5	+69 53	Ma	4.06	3.3	3.6	4.10	4.05	*76,46*,04,*01*	167	.072	*0.16*	74	02
48	4504	2015	36.9	+67 18	Ma	5.48	..	..	5.00	5.48	....*48*,00	166	.056	*0.21*	68	03
49	4610	2058	12 0.6	+63 30	K	6.24	..	..	..	6.22	......*02*	170	.051	0.17	57	02
50	4727	2107	20.4	+64 22	K	6.37	..	..	..	6.35	......*02*	155	.063	0.52	75	07
51	4765	2124	25.7	+69 45	Ma	5.25	..	..	5.30	5.25	05,00	147	.056	*0.48*	69	04
52	4916	2197	51.5	+65 59	F0	5.27	..	..	5.35	5.28	08,01	159	.077	0.38	70	07
53	4934	2209	57.9	+64 9	F	6.02	..	..	..	6.03	01	149	.051	0.25	64	05
54	5018	2250	13 13.2	+68 56	A	6.11	..	..	..	6.12	01	144	.071	0.45	52	01
55	5085	2279	24.8	+60 28	A0	5.41	..	..	..	5.42	01	147	.066	0.14	64	*04*
56	5213	2348	46.5	+61 59	K	6.05	..	..	..	6.04	......*01*	145	.065	*0.54*	67	*01*
57	5226	2356	48.5	+65 13	Ma	4.77	4.4	4.6	4.73	4.74	*37,17,04,03*	131	.056	0.23	57	02
58	5334	2399	14 10.2	+69 54	Ma	5.36	..	..	..	5.34	......*02*	149	.059	0.40	57	08
59	5492	2460	39.5	+61 41	F	6.17	..	..	..	6.20	03	169	.061	*0.23*	65	*02*
60	5563	2500	51.0	+74 34	K5	2.24	2.1	2.0	2.26	2.24	*14,24*,02,00	158	.089	0.28	61	06
61	5589	2510	56.0	+66 20	Mb	4.86	..	..	..	4.85	......*01*	127	.065	*0.48*	52	01
62	5735	2566	15 20.9	+72 11	A2	3.14	2.1	3.2	4.40	3.14	R,06,R,00	155	.071	0.12	53	*03*
63	5774	2569	22.7	+59 19	K0	3.47	3.3	3.6	3.42	3.47	*17*,13,*05*,00	141	.082	0.55	53	01

No.	H. R.	H. P.	R.A. 1900.		Dec. 1900.		Spect.	H. R.	R.	S.	W. H.	1879–1902.	Resid.	No.	A. D.	Corr.	L. C.	
			h.	m.	°	′											No.	Res.
64	5785	2593	15	29.6	+64	33	G5	5.88	..	..	..	5.86	...... *02*	122	.053	*0.69*	44	*07*
65	5986	2696	16	0.0	+58	50	F8	4.11	3.8	4.2	4.40	4.12	*31*,09,29,01	159	.047	0.06	61	*03*
66	6025	2717		6.0	+68	4	A0	5.40	..	..	..	5.43	 03	160	.085	0.61	61	01
67	6132	2766		22.6	+61	44	G5	2.89	3.3	3.2	2.50	2.88	41,31,*39*,*01*	156	.075	0.21	60	*01*
68	6161	2781		28.2	+68	59	B8 p	4.98	..	..	5.20	4.99	 22,01	150	.083	0.47	55	01
69	6223	2813		40.2	+64	47	K5	5.00	5.0	4.9	5.08	4.95	00,*10*,08,*05*	136	.075	*0.35*	51	01
70	6335	2854		58.3	+73	17	A	6.24	..	..	..	6.25	 01	170	.069	0.21	65	03
71	6396	2878	17	8.5	+65	50	B5	3.22	3.3	3.2	3.23	3.23	08,*02*,01,01	186	.070	0.38	57	03
72	6573	2955		33.9	+61	58	F	5.31	..	..	5.40	5.30	.... 09,*01*	171	.046	*0.25*	58	*01*
73	6596	2964		37.5	+68	48	F5	4.87	5.4	5.3	4.85	4.86	53,43,*02*,*01*	169	.052	0.38	57	*04*
74	6636	2985		43.7	+72	12	F5	4.58	4.4	4.2	..	4.56	*18*,*38*,*08*,*02*	140	.072	0.37	44	*08*
75	6850	3081	18	13.3	+64	22	F5	5.03	..	..	5.30	5.05	 27,02	181	.054	0.09	55	*05*
76	6920	3120		22.2	+71	17	Ap	4.24	4.4	3.8	4.50	4.25	16,*44*,26,01	200	.072	1.07	51	03
77	6927	3122		22.9	+72	41	F8	3.69	4.4	4.2	3.50	3.68	71,51,*19*,*01*	218	.044	0.38	49	*04*
78	6945	3126		25.7	+65	30	K0	4.99	..	..	5.15	4.97	.... 16,*02*	173	.056	*0.03*	39	03
79	7310	3307	19	12.5	+67	29	K0	3.24	4.4	3.6	3.10	3.22	R ,36,*14*,*02*	253	.048	0.73	68	00
80	7352	3328		17.5	+73	10	K0	4.63	5.0	4.6	4.46	4.63	37,*03*,*17*,00	255	.051	0.11	71	08
81	7462	3389		32.6	+69	29	G5	4.78	5.0	4.6	4.80	4.78	22,*18*,02,00	257	.036	0.30	56	02
82	7582	3447		48.5	+70	1	K0	3.99	4.4	3.8	3.80	4.00	41,*19*,*19*,01	242	.047	0.34	60	05
83	7676	3498	20	0.4	+64	32	Ma	5.43	..	..	5.50	5.40	.... 07,*03*	219	.069	*0.39*	61	*01*
84	7685	3506		2.3	+67	35	K0	4.66	4.4	4.6	4.70	4.67	*26*,*06*,04,01	193	.052	0.32	52	04
85	7850	3594		27.9	+62	39	A5	4.28	4.4	4.2	4.30	4.31	12,*08*,02,03	225	.082	*0.35*	49	*06*
86	7945	3650		41.9	+66	18	A	5.57	..	..	5.50	5.58	.... *07*,01	212	.065	0.16	55	00
87	7957	3656		43.3	+61	27	K0	3.59	..	..	3.73	3.55	.... 14,*04*	202	.077	*0.29*	45	*04*
88	8162	3757	21	16.2	+62	10	A5	2.60	3.3	3.2	2.65	2.60	70,60,05,00	231	.048	0.45	54	*04*
89	8238	3798		27.4	+70	7	B1	3.32	4.4	3.7	3.25	3.31	R ,38,*07*,*01*	237	.074	0.73	55	00
90	8334	3855		42.6	+60	40	A2 p	4.46	..	4.6	4.30	4.48	.. 14,*16*,02	208	.071	*0.53*	47	04
91	8400	3892		57.8	+72	42	F	5.15	..	..	5.20	5.16	 05,01	228	.043	*0.38*	51	*02*
92	8417	3903	22	0.9	+64	8	A8	4.40	5.0	4.9	4.42	4.41	60,50,02,01	204	.055	0.02	42	02
93	8557	3969		23.5	+70	16	K	5.69	..	..	..	5.67	...... *02*	215	.049	*0.30*	51	*02*
94	8627	4009		35.1	+63	4	A2	5.21	..	..	5.15	5.21	.... *06*,00	214	.056	0.06	50	02
95	8694	4037		46.1	+65	40	K0	3.68	3.8	3.8	3.80	3.67	12,12,12,*01*	199	.077	*0.23*	44	07
96	8819	4098	23	4.7	+74	51	G5	4.56	..	..	4.60	4.55	.... 04,*01*	214	.066	0.33	46	*01*
97	8872	4127		14.5	+67	34	G5	4.90	..	..	4.90	4.90	 00,00	196	.058	*0.09*	47	09
98	8972	4181		35.0	+73	25	G	6.08	..	..	..	6.07	...... *01*	202	.056	*0.09*	52	00
99	8989	4191		37.6	+63	58	Ma	6.85	..	..	..	6.83	...... *02*	180	.091	*1.33*	39	*10*
100	9104	4256		59.5	+66	36	K	5.84	..	..	..	5.81	...... *03*	188	.064	0.12	43	04

The results found by grouping the material contained in Table III, according to the class of spectrum, are given in Table IV. The class of spectrum, the number of stars contained in the group, and the algebraic mean of the residuals contained in the twelfth column of Table III are given in the first six columns of Table IV. The arithmetical mean of the residuals in the fourteenth and fifteenth columns of Table III are given in the seventh and eighth columns.

TABLE IV.

EFFECT OF SPECTRUM.

Sp.	No.	P	S	H	M	Σ	Δ	Sp.	No.	P	S	H	M	Σ	Δ
B	9	.59	.35	.10	.01	.067	0.36	G	10	.32	.27	.03	.00	.056	0.24
A	21	*.25*	*.15*	.15	.01	.064	0.33	K	28	.26	.06	.01	*.01*	.056	0.00
F	17	.46	.36	.12	.00	.052	0.10	M	15	*.25*	*.21*	*.03*	*.02*	.075	*0.25*

All four of the catalogue residuals for spectra of Class B are positive, and all four relating to Class M, are negative. Only four of the stars of Class B were observed by Ptolemy and Sûfi, and the negative residuals of Class A render it uncertain whether these deviations are real, or due to accidental error. The results for Herschel given in H.A. 64, 118 and 125 depend on a much larger amount of material, and render it probable that the deviations, if any, are small. The figures in the last column, if real, would indicate a slight progressive diminution in brightness of white stars and a slight increase for stars of Class M. This difference is probably due to other causes, since the mean period is only 12.8 years, while a difference of even a tenth of a magnitude would correspond to a whole magnitude since the time of Herschel and nearly twenty magnitudes since the time of the Almagest. As the latter appears to afford the most sensitive test for secular variation of the stars, a discussion of the entire catalogue appears to be desirable. The material for this is contained in H.A. 14, and will be made the subject of a separate investigation.

The last column of Table III furnishes a means of determining whether the coefficient of atmospheric absorption varies with the class of spectrum. Light of a red color has a smaller coefficient of absorption than that of a blue color, as is shown by the red color of the Sun and Moon when near the horizon. This is also confirmed by the large value of the photographic absorption shown in H.A. 19, 253. Table II furnishes much better material for deciding this question than Table III. Not only are more stars included but many of them have a much greater zenith distance when at lower culmination, so that the absorption is much greater. Since several stars were used each evening in determining the absorption, it is evident that if any particular class had a greater coefficient of absorption it would show itself by a preponderance of positive residuals. In each case, these residuals would be proportional to the length of path traversed by the light. A grouping has accordingly been made of the residuals in each volume and for each class of spectrum. The results are contained in Table V. The class of spectrum is given in the first column. The residuals were combined for each six hours of right ascension, 0^h to 5^h, 6^h to 11^h, 12^h to 17^h, 18^h to 23^h, inclusive, and for all, 0^h to 23^h. The limiting hours for each group are given in the second column. The third and fourth columns contain the numbers of stars included in each group for the four volumes H.A. 14, 23, 44, and 45, and for all. The mean lengths of path are given in the fifth and sixth columns for each, and for all of the volumes. They are found by taking the sums of the lengths of path, and dividing them by the corresponding numbers in the third and fourth columns. The means of the residuals, expressed as a fraction of the total absorption for each, and for all, of the volumes are given in the seventh and eighth columns. They are derived from the alternate columns of Table II, by taking the mean of the residuals expressed in magnitudes for each group, and dividing by 0.26 times the corresponding length of path. The coefficient 0.26 is equal to the mean value given in H.A. 23, 107. This quantity is somewhat uncertain since it depends on the nights selected for observation. It would evidently be much smaller if observations were made on very clear nights only, than if hazy nights were also included. The first group in the last column of Table V may be taken as an example. It includes all stars of Class B, in 0^h to 5^h of right ascension. The mean of the residuals in this group is -0.033 magn. The average length of path is 4.72, and accordingly the absorption would be $4.72 \times 0.26 = 1.23$ magn. Dividing -0.033 by this, gives the required fraction -0.027. This means that for these stars the absorption is less than its mean value by two and seven tenths of one per cent.

It will be noticed that the residuals in Table V grow smaller as the number of stars increases, which reduces the accidental error. A systematic error would become more marked in this case.

The largest residual in the last column is the second one, and this is due to the discordance of a single star in H.A. 14. There is no perceptible deviation dependent on the class of spectrum. We may, therefore, conclude that the effect of color of the stars, on the coefficient of absorption, is inappreciable.

TABLE V.

RESULTS OF TABLE II.

Sp.	Reg.	Numbers.				All.	Mean Paths.				All.	Corrections.				All.
		14	23	44	45		14	23	44	45		14	23	44	45	
	h. h.															
B	0 – 5	5	20	19	15	59	2.64	5.26	5.17	4.10	4.72	.089	.012	*.065*	*.050*	*.027*
	6 – 11	1	3	3	3	10	1.90	3.07	.307	3.07	2.95	.608	.046	*.008*	.058	.069
	12 – 17	2	4	4	4	14	1.95	6.48	6.48	6.48	5.83	*.246*	.058	.019	*.038*	.000
	18 – 23	1	17	17	16	51	1.60	4.97	4.97	4.49	4.75	*.023*	.008	.015	.000	.008
	0 – 23	9	44	43	38	134	2.29	5.11	5.07	4.43	4.71	.065	.015	*.019*	*.023*	*.004*
A	0 – 5	7	46	36	39	128	1.84	4.80	4.24	4.61	4.42	.192	*.012*	.027	.046	.023
	6 – 11	4	29	30	28	91	2.08	4.96	5.28	4.70	4.86	.300	*.023*	*.023*	.000	*.012*
	12 – 17	5	36	36	31	108	1.94	5.25	5.25	4.99	5.02	*.150*	.019	.004	*.019*	.000
	18 – 23	5	40	41	34	120	2.42	5.38	5.63	5.25	5.32	*.119*	*.015*	*.035*	.004	*.019*
	0 – 23	21	151	143	132	447	2.05	5.09	5.11	4.88	4.89	.050	*.008*	*.008*	.008	*.004*
F	0 – 5	4	16	10	15	45	2.50	4.12	4.09	4.19	3.99	.123	.012	*.073*	*.019*	*.012*
	6 – 11	6	17	17	16	56	2.40	3.81	3.81	3.59	3.60	.081	.038	*.015*	.000	.012
	12 – 17	4	15	15	13	47	2.60	5.32	5.32	4.66	4.91	*.096*	.027	*.019*	*.027*	*.008*
	18 – 23	3	15	14	14	46	2.23	5.65	5.14	5.14	5.12	*.131*	*.008*	*.015*	.008	*.008*
	0 – 23	17	63	56	58	194	2.44	4.69	4.60	4.36	4.37	.012	.015	*.027*	*.008*	*.004*
G	0 – 5	2	9	8	9	28	3.60	4.78	4.98	4.78	4.75	.000	.019	*.012*	.000	.004
	6 – 11	2	9	10	9	30	2.80	4.30	5.26	4.30	4.52	.008	*.027*	.000	.042	.004
	12 – 17	3	12	12	11	38	2.33	5.26	5.26	4.65	4.85	*.343*	.046	*.004*	.008	.004
	18 – 23	3	12	12	12	39	1.70	4.00	4.00	4.00	3.82	*.135*	*.054*	*.023*	*.012*	*.035*
	0 – 23	10	42	42	41	135	2.49	4.59	4.85	4.41	4.46	*.123*	.000	*.008*	.008	*.004*
K	0 – 5	3	20	17	18	58	2.10	5.06	4.65	4.26	4.54	.158	*.012*	*.012*	*.077*	*.027*
	6 – 11	7	34	34	34	109	2.17	4.10	4.10	4.10	3.98	.077	*.004*	*.042*	*.038*	*.023*
	12 – 17	6	20	21	19	66	2.80	4.04	4.53	3.57	3.95	*.054*	.054	*.004*	*.062*	*.004*
	18 – 23	12	42	39	37	130	1.88	4.58	4.66	4.09	4.21	.112	.000	*.038*	.008	*.008*
	0 – 23	28	116	111	108	363	2.18	4.43	4.46	4.03	4.15	.062	.004	*.027*	*.035*	*.015*
M	0 – 5	3	7	6	7	23	2.57	3.01	2.85	3.01	2.91	.019	.104	*.100*	*.031*	.000
	6 – 11	4	8	8	8	28	2.12	3.71	3.71	3.71	3.49	*.081*	.073	*.046*	.077	.023
	12 – 17	6	11	10	10	37	1.87	4.52	3.59	3.59	3.59	*.046*	.058	.042	*.004*	.031
	18 – 23	2	9	9	9	29	2.45	2.98	2.98	2.98	2.94	*.219*	*.015*	*.015*	.054	*.004*
	0 – 23	15	35	33	34	117	2.15	3.64	3.32	3.34	3.27	*.065*	.054	*.015*	.027	.015
All	0 – 23	100	451	428	411	1390	2.23	4.71	4.71	4.37	4.43	.012	.008	*.019*	*.004*	*.004*

A grouping was next made to determine whether the adopted relation of the length of path at different altitudes is correct. This was taken from Table

XVI in H.A. 23, 96, when the zenith distance is less than 85° 12′. For greater zenith distances it was taken from Table VI of H.A. **44**, 176. Since observations of stars at various zenith distances were combined in deriving the coefficient of absorption for each series, it is evident that any error in the assumed law will show itself when the residuals are grouped according to the length of path. The results of this grouping are shown in Table VI. The limits of the groups are for paths 1.0 to 1.9, 2.0 to 2.9, 3.0 to 3.9, etc. The central points of the groups are accordingly, 1.45, 2.45, 3.45, etc. The character of the group is indicated in the first column. The result of the grouping is shown in the next fourteen columns. The last line but one gives the results derived from all the stars. They show a tendency to negative values which are nearly represented by the correction 0.002 p in which p is the length of path. This is equivalent to the statement that the coefficient of absorption derived from all the stars is less by about one per cent than that actually adopted. The last line gives the results after applying this correction.

TABLE VI.

LENGTH OF PATH.

Group.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Number B	5	13	6	3	3	3	4	0	2	1	1	1	1	1
" A	19	31	23	11	17	11	11	10	7	1	1	5	5	3
" F	6	18	14	6	4	3	1	1	2	1	2	3	1	0
" G	7	6	7	7	4	3	3	2	2	0	1	0	1	0
" K	20	24	19	20	10	5	4	3	3	1	1	3	3	1
" M	5	17	3	4	3	0	0	0	0	2	0	0	1	0
" All	62	109	72	51	41	25	23	16	16	6	6	12	12	5
Mean B	*.002*	*.005*	*.027*	.020	.013	*.060*	*.138*	..	.015	.040	.050	.140	*.200*	.230
" A	.018	*.017*	*.011*	.020	.007	*.019*	.025	*.021*	*.077*	*.050*	.080	*.084*	.048	.223
" F	*.002*	.003	.010	.010	*.005*	*.090*	.010	*.030*	*.065*	*.020*	.000	*.017*	*.270*	..
" G	*.014*	*.003*	.001	*.076*	*.020*	.023	*.017*	.175	.075	..	*.140*	..	*.100*	..
" K	.010	.002	*.036*	*.025*	*.037*	*.022*	*.040*	.013	*.097*	*.030*	*.160*	.033	*.123*	.090
" M	.032	*.002*	*.023*	.035	*.053*	..	..	..	..	.085	..	..	.040	..
" All	.009	*.005*	*.014*	*.011*	*.004*	*.028*	*.020*	.009	*.049*	.018	*.028*	*.028*	*.055*	.198
Corr.	.012	.000	*.007*	*.002*	.007	*.015*	*.005*	.026	*.030*	.039	*.005*	*.003*	*.028*	.227

The results in the last line are apparently no greater than the accidental errors. The large value in the last group is evidently due to the low altitude of about two degrees. None of the other values exceed four one hundredths of a magnitude. Their mean value is ±0.014 magn. All of the one hundred standard stars are contained in the first three groups, which have an average value of ±0.006 magn. On the whole it does not seem safe to apply any correction to the values of the length of path already used. All of these residuals may be converted into proportions by dividing by 0.26 as in Table V.

END OF VOLUME LXIV.

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